THE AMERICAN GAS LIGHT JOURNAL

REDWANK'S CHUY, N.Y.

PUBLISHING OFFICE No. 32 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, VENTILATION, WATER SUPPLY AND DISTRIBUTION, & GENERAL SCIENCE.

VOLUME LXIV.—No. 14. Whole No. 1,087. | NEW YORK, MONDAY, APRIL 6, 1896 | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager.
JOS. H. THOMAS, C.E., Editor. T. J. CUNNINGHAM, Asst. Editor.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

Published on each Monday of the year, at No. 32 Pine Street, New York.

Terms of Subscription, Including Postage—For the United States and Canada, $3 per annum. European countries, $4.50 (19 shillings—22½ francs). All payments to be made in advance. Single copies, 10 cents.

Remittances should be made either by post office order, express money order, registered letter, or bank draft on New York, payable to the order of A. M. Callender & Co.

Collections are invariably made directly from this office for subscriptions, advertisements, etc. We have agents to solicit the same, but they are not authorized to receipt for money.

The American News Company, Nos. 39 and 41 Chambers street, New York, are agents for this JOURNAL. Newsdealers will send orders to them.

Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

CONTENTS.

An Asterisk (*) denotes an illustrated article.

OFFICIAL NOTICES—

April Meeting, Society of Gas Lighting..... 525

April Meeting, Guild of Gas Managers..... 525

EDITORIALS—

Briefly Told 525

Counterfeiting Welsbach Lamps—Mr. Chollar's Bereavement—The May Meeting of the Texas Gas and Electric Light Association—Another Proposed State Association—Notes.

Twelfth Annual Meeting of the Ohio Gas Light Association—Official Report—Revised by the Secretary—Continued from page 495..... 526

First Day, Afternoon Session—Dots and Dashes, by Mr. E. H. Jenkins—Discussion—Mains and Services: Their Extension into New Territory, by Mr. George Light—Discussion—A Dip into the Question Box, by which Queries Nos. 4, 5 and 6 were Discussed—Second Day, Morning Session—A Query Respecting Acetylene Gas—Report of Committee on President's Address—Selling Gas, by Mr. Henry L. Doherty.

Notes on the Foundations of the Mutual Company's New Gasholder Tank, by Mr. Walter A. Allen..... 536

ITEMS OF INTEREST FROM VARIOUS LOCALITIES..... 537

Mr. Jackson Takes Charge at Sacramento, Cal.—The Stockton (Cal.) Company Boring for Natural Gas—Possible Change in Ownership, Evansville, Ind.—Contract for the Berlin Iron Bridge Company—Proposed Gas Works for Merida, Yucatan—No New Opposition Company for Washington, D. C.—The Emporia (Kas.) Plant may be taken over by the Authorities—Public Lighting, Charleston, S. C.—Mr. Voorhis Going Ahead Evenly at Nyack, N. Y.—The Complaint Against State Inspector Pauley—New Plant for the Northwestern Gas Light and Coke Company—A Budget from "Western Observer"—The Peoples Gas Company, of Chester, Pa.—Cheaper Gas for Marietta, O.—The Decision on the Jamaica Plain Petition—And Other Items.

The Market for Gas Securities..... 539

[OFFICIAL NOTICE.]

April Meeting, Society of Gas Lighting.

OFFICE OF THE SECRETARY, March 27, 1896.

The April meeting of the Society of Gas Lighting will be held in the Arena, No. 39 West 31st street, New York City, at 3 P.M. of Thursday, April 9.

FRED. S. BENSON, Sec'y.

[OFFICIAL NOTICE.]

April Meeting, Guild of Gas Managers.

OFFICE OF THE SECRETARY, March 28, 1896.

The April meeting of the Guild of Gas Managers will be held in Young's Hotel, Boston, at noon, Saturday, April 11.

A. K. QUINN, Sec'y.

BRIEFLY TOLD.

COUNTERFEITING WELSBACH LAMPS.—It has been an aphoristic saying for many years that imitation is the sincerest form of flattery, and we are quite certain that the management of the Welsbach Commercial Company's New York branch, while admitting the truth of the aphorism, are not at all pleased that there is so much of truth therein; for they have been putting much time of late, and have gone to considerable expenditure as well, in running to earth a rascally lot, whose "imitating flattery" went the length of counterfeiting Welsbach lamps and exposing the same for sale as genuine products of the Gloucester factory of the Welsbach Light Company. The first intimation the Welsbach folks had that something was wrong with their goods in this city was much complaint on the part of some users that their mantles were not only imperfect but valueless, in that their usefulness was virtually at end almost before it should have rightly begun. Investigation on the Company's part revealed the fact that the complained of mantles and lamps, in about every instance, had not been furnished by the Company; and as the latter's organization in this city (and, for that matter, in other places) is pretty well up to the times, no hours were lost in instituting a search for the Welsbach shop that was being conducted independently of real Welsbach practice. To make it short, the prosecution of the search resulted in the indictment, by the March Grand Jury, of no less than 42 persons, who had, in one way or another, been instrumental in foisting spurious Welsbach lamps upon those "close purchasers" of goods in New York city, who will listen to the voice of the peddler, and take his word for it that he sells the "genuine article" at 50 per cent. (or higher) less than the only honest dealer in the trade can sell it for. The testimony on which the indictments were based showed a nicely arranged conspiracy to defraud the Welsbach Company, by which the indicted successfully palmed upon their victims spurious wares, at cut rates. To our minds, the only defect in the Welsbach Commercial Company's prosecution of its hunt was its failure to prosecute the parties who purchased the goods from the hands of the counterfeiters. Meantime, we understand that crusades of a nature like the one just completed in New York are underway in one far and in one nigh Western city, and the JOURNAL'S hope is that justice shall be done, though the heavens fall, irrespective of any desire on the part of anyone in one place to save somebody else in another place. The Company, in any event, should have full credit for its courage in sustained effort to save its patrons from discomfiture and loss.

MR. CHOLLAR'S BEREAVEMENT.—"A long, placid and useful life was ended when death closed the day and temporal time of Lucy Caroline Chollar (the mother of Mr. Byron E. Chollar), who passed away, as the leaves of autumn go. Deceased, who was 86 years old, was the daughter of Samuel Titus, the inventor of the horse shoeing machine, and had

lived in Brooklyn, N. Y., almost all her days. Simple, sweet and womanly, her ending was as her living. The funeral services were held at her late home, 305 Quincy street, Brooklyn, on the evening of March 24th, the Rev. Mr. George R. Cutting, pastor of the Westminster Presbyterian Church, Yonkers, N.Y., officiating. Interment was made in the family plot, at Danielson, Conn., the following day. In his double bereavement (his brother died some weeks ago) Mr. Chollar has the sympathy of the fraternity.—C."

THE MAY MEETING OF THE TEXAS GAS AND ELECTRIC LIGHT ASSOCIATION.—We are indebted to Mr. Homer W. Starr, Secretary of the Texas Gas and Electric Light Association, for some advance information respecting the May meeting of the Association, which will take place this year on May 12th and 13th, at Dallas, under the Presidency of Mr. W. E. Holmes, of Austin. Although this is only the second annual meeting of the Texas Association, the executives have, even at this early date, more than a promise of hope to hold out, as they now are assured of three papers, while much more than a half-hearted advice is given that the ultimate number shall be six. Following the prevailing practice, it is also outlined that the paper list will be supplemented by dips into a Question Box and by an examination of "Wrinkles" that neither time nor trial has sufficed to smooth out their effectiveness. The Committee of Arrangements (Messrs. T. D. Miller, H. L. Monroe and J. C. Lord) promise that nothing shall be left undone to secure the comfort of those who attend the meeting; and their naming is sufficient guarantee that everything that should be done will be done. It is also proposed to print the papers in advance of the meeting, to the end that fair discussion thereon will be promoted.

ANOTHER PROPOSED STATE ASSOCIATION.—The latest Richmond in the field, for the purpose of conserving the gas interests of a single State, comes to us in the shape of the following announcement, from Mr. E. M. Highlands, of Clinton, Ia., who, as Secretary of the body that considered the desirability of forming a State Association for Iowa, has caused the preparing and publishing of the following circular letter:

"CLINTON, IA., March 28th, 1896.

"Dear Sir: At a meeting, held at Des Moines on March 3d, 1896, of several gas men, representing some of the largest Gas Companies of the State, it was determined to form a State organization of gas men, similar to those of Ohio, Michigan, California and Texas.

"Mr. A. T. Averill, of Cedar Rapids, was appointed President, and Mr. Edward M. Highlands, of Clinton, Secretary of the temporary organization; and Messrs. L. L. Kellogg, of Sioux City, and E. G. Pratt, of Des Moines, were appointed a committee to draft a constitution and by-laws.

"I would earnestly request that you or a representative of your Company should join our organization and make application to become a charter member of it. There is room and need for such an organization, and we are confident that great good can be done, if all will assist in the matter.

"If sufficient interest is shown by the gas men of the State it is our intention to call a special meeting in the near future. In order to expedite the matter, please signify your willingness to be enrolled as a charter member as soon as possible. E. M. HIGHLANDS, Secretary."

NOTES.—Mr. A. M. Sutherland's offices have been removed from 136 Liberty street, to No. 231 Broadway, this city.——Articles announcing the incorporation of the Metropolitan Gas Company, of Los Angeles, Cal., have been filed by Messrs. H. J. Woolcott, Geo. H. Bonebrake, A. Jacoby, W. J. Washburn, Datus C. Smith and M. T. Allen. The capital stock has been "adjusted" at $1,000,000, of which amount $600 is at this writing subscribed; the rest may come to hand in time.——The proprietors of the Sunbury (Pa.) Gas Company have, after waiting almost to be aroused by the falling of the works' walls, determined to put several thousand dollars in plant improvements.——Mr. J. L. Janeway, of the firm of Janeway & Logan, builders of gas producing apparatus, died on March 25th. At one time in his business career Mr. Janeway was the lessee of the Phœnix Gas Company, of Phœnixville, Pa.——The Supreme Court of Washington has declared that the authorities of that State have no right to say at what price gas shall be sold in the cities, towns or villages thereof.——At a meeting of the shareholders of the San Luis Obispo (Cal.) Gas Company the following Directors were chosen: Messrs. H. Brunner, J. K. Prior, J. Barneberg, F. D. Frost and H. J. Edwards. The Board subsequently elected Mr. Brunner President.——The new plant of the Santa Barbara (Cal.) Company is completed.

[OFFICIAL REPORT—REVISED BY THE SECRETARY—CONTINUED FROM PAGE 495.]

TWELFTH ANNUAL MEETING OF THE OHIO GAS LIGHT ASSOCIATION.

HELD AT THE GRAND HOTEL, CINCINNATI, O., March 18 and 19, 1896.

FIRST DAY—AFTERNOON SESSION.

The Association reconvened at 2 P.M. The President introduced Mr. E. H. Jenkins, of Covington, Ky., who read the following paper, entitled,

DOTS AND DASHES.

In attempting to prepare a paper to be read before this Association, one of the most difficult features is the selection of a subject.

When one looks at the list of papers read and topics discussed by the various Gas Associations of the country, it would seem that every possible subject connected with the manufacture and distribution of artificial gas had been treated upon in some manner or other.

That was the thought of the writer when, after promising your genial Secretary that he would furnish a paper for this meeting, he tried to find a suitable subject.

Believing that a gathering together of several minor items, any one of which would not furnish sufficient food for a paper, but by combining these various matters, enough might be secured to prove of interest, and perhaps cause the members to think of other similar items, and in that way bring out a discussion that would be of benefit, I decided to attempt to furnish a few facts, and will expect the members to make a few dashes from their box of knowledge, and thereby help push a good thing along. I do not expect to furnish anything new or startling, but may remind some one of a thing or two forgotten or neglected, and if so will feel that this paper's mission is accomplished.

One of the most essential things for a gas superintendent to do, is to deal fairly with himself in all matters, and not average or assume a result unless positively certain it has been accomplished. To do this, it is just as necessary to accurately weigh every pound of coal used as it is to register the amount of gas made each day. Making a wagon or a wheelbarrow of a certain size, and then counting the number of loads used each day, depending upon the stokers to fill the wagon exactly the same each time, is not accuracy and will account, many times, for the variance in yields obtained from same coals during different periods. A good pair of scales of ample size, balanced at least once each day, and an accurate account kept of the amount of coal used, is the only way to *know* just what is being done, and when followed up closely, the stokers will soon realize that just returns are expected of them each day, and they will be apt to accomplish better results.

In retort houses that have a basement, where the hot coke is dropped into wagons before being carted out, an arrangement of a spray of water to play on the hot coke as it drops into the wagon, and thereby deaden it, will save several dollars each year in the wear and tear on the wagons. It is not necessary to put enough water on at this time to thoroughly quench the coke, as that would make the basement too damp. A similar arrangement can be used in small works where the retort house labor is limited, and was illustrated by Mr. C. M. Gregory, in the Wrinkle Department of the Pacific Coast Gas Association of 1895.

A liberal distribution of pressure gauges is a very important feature in every gas works, and if these are carefully noticed each day, any increase in back pressure will be quickly seen, the cause ascertained, and the proper remedy applied before it gets to be troublesome. If these gauges are located properly, any stoppage can be located easily, and in that way much valuable time saved, and a great deal of annoyance prevented.

I visited a gas works not long ago, a works with an annual output of over thirty millions, and there was not a single pressure gauge between the exhauster and station meter. The only way they would find out that there was a stoppage was when some seal would "blow." When they had a stoppage, and such a thing happened frequently with them, the men would be perfectly "at sea," and it would usually take them several hours to locate the trouble. I ought to add that this gas works was not in Ohio.

Accuracy in registering the amount of gas made is absolutely necessary, and in order to accomplish this correctly two very essential facts must be known. First, that a correct water line is established on the station meter, and water kept up to this line by a suitable overflow

gauge, etc., and, secondly, an accurate register of the temperature of the gas when passing the station meter, and the meter reading corrected accordingly, taking into consideration also the barometric pressure. This correction for temperature is a very important matter, and while it may reduce the supposed yield, yet it is the only just and fair way to deal with one's self.

Not long ago Mr. A., the President of a certain gas company, called on Mr. B., the President of a larger company, saying that their leakage account was quite large, and asking Mr. B. what he thought was the cause. "What is the temperature of the gas as it passes the station meter?" asked Mr B. The reply was they didn't know. "Then," said Mr. B., "I can tell you nothing about your leakage until you find this out." In other words, if the gas is registered at 70° temperature, you will have 1000 cubic feet to account for, when in reality you have made only 974 cubic feet—assuming barometer at 30″. Your yield will be high, also your leakage account.

Speaking about leakage, Secretary Lathrop in a recent letter suggested that I might be able to give some dots on this subject. While I have had, and in fact am now having some experience with leakage, I do not think I can advance any ideas on the subject other than those that have already been brought before the members of this Association. Earnest, persistent and hard work is usually necessary in order to reduce the leakage account. There are two important factors in accounting for or controlling leakage. The first I have already mentioned, that is the correcting of the station meter readings according to temperature and barometric pressure; the second is the use of a pressure governor of the best pattern. Whenever you can, have heavy or full pressure on the mains only during the hours of heavy consumption, and, as the demand for gas decreases have the pressure reduced in this way, you will have made a long step towards keeping your leakage account down.

As far as leakage is concerned, I would just as soon be without a station meter as to be without a pressure governor. In this connection a recording pressure gauge is also necessary, for by it you can tell of any serious break in the main either day or night.

There are many ways that those who are in charge of the affairs of plants of moderate size—like those of the majority represented here to-day—can promote the welfare of their companies. Perhaps the ladies of the town have an Art Club and wish to give a reception to their friends, and at the same time make a display of their painting, fancy work, etc. A liberal offer from the gas company to take special pains in order to give them the best possible light, arranged so as to give the very best results, will not only make friends for the company, and if properly handled be made a good and cheap advertisement, but will afford pleasure to the representative of the company.

Usually there is a Charity Fair or Festival given, in which the public generally take part, and which is in charge of your best gas customers. Such an occasion is one that gives a company an excellent chance to make friends, help a worthy cause, and at the same time show what it can do in the way of light and fuel. Perhaps the Jewish synagogue—the Catholic cathedral or the Methodist church may have a special occasion that may offer similar opportunities for "doing good" for the gas company.

It pays to take advantage of such matters and makes you solid with your customers who come from all classes, even Republicans and Democrats. It pays to stand in with the members of the Fire Department and Police Force—especially the latter—they will frequently give you pointers about leaks in streets that will be valuable.

I presume I am safe in saying that no gas company is free from visits from the chronic kicker, and I am afraid some of us would think we had not "done our full duty" if we did not hear from him regularly. Yet there are many who complain about the "enormous gas bills," and especially of the fact that their bill is "double what it was last month, when they hadn't used a foot more gas," who are sincere and honest in their complaint. We find ourselves at a loss in attempting to account for the fact. That the bill is right we are fully satisfied, but how to prove it to the consumer's satisfactfon is an entirely different matter. I have found that by a little extra labor a number of such cases *can* be explained satisfactorily to the party making the complaint.

A memorandum book alphabetically arranged, in which the various social or other events are noted, will frequently be found of great value in this regard. For instance, "Mrs. Wilson entertained with a tea on the 15th inst., from 2 to 6 P.M." We all know that on such occasions the windows are darkened and the gas burners used freely, and in one such afternoon as much gas is used as ordinarily would be consumed in a week. Of course when Mrs. Wilson comes to pay her gas bill for that month she has forgotten about the "tea," and when you remind her of it you can generally explain why her bill for that month is so much larger than usual.

"Mr. Smith's children have been ill for several weeks and have required constant attention night and day." The memorandum will quite likely explain why his bill is very much larger than usual. Of course Mr. Smith, when his attention is called to the fact, will perhaps kick just the same and accuse the gas company of taking advantage of his misfortune; but after he has paid his bill and left the office he will really have more faith in his meter and get an idea that perhaps the gas company are not such rascals after all. He will be more cautious in making another kick in regard to his gas bill.

I once had a case in regard to the bill of a church. Their bills varied but a trifle each month, usually being about $8. One month their bill was over $18. Mr. B., the Treasurer, was a perfectly reliable and honest gentleman, who always prided himself on paying the gas bills promptly. However, when this bill for $18 was presented he proceeded to give a prodigious kick. Knowing that I read the meter and made out the bill he did not take long in hunting me up and proceeding to "orate" on the impossibility of their church using that amount of gas in one month. After letting him have his say, I referred to my little memorandum book and asked him if he remembered the fact that the Knight Templars had a flag presentation and other exercises on a certain date; if he remembered that the W. C. T. U. had lectures on two evenings during the month (giving dates), and also the fact that for six nights in one week they had special services. He had really forgotten about these meetings, and when the facts and dates were presented to him he was perfectly satisfied with the bill and paid it cheerfully. You can readily see, that by a little care, a record of parties, weddings, socials, etc., can be made that will be of great service at the time, and will help explain many of the variations in gas bills.

In this connection a "blue pencil" will be found of value. When you read an article that touches upon matters pertaining to artificial light, mark it with your blue pencil and then see that the clipping is posted in a handy scrap book. You will in this manner, in a very short time, accumulate a fund of useful information, and will find many occasions where such information will be of value.

Now, Mr. President, I think I have fulfilled the promise made at the beginning of this paper, that I would not furnish anything new or startling, but I trust the members will add some items from their own experiences, and in that way bring out information that may be of value.

Discussion.

The President—Gentlemen, this paper is of great interest to us all, and it should be very fully and thoroughly discussed.

Mr. Hayward—Mr. President, the paper is a well prepared one, but at the bottom of page 3, on the subject of "leakage," I do not understand why that is not printed in capital letters. (Laughter.)

The President—Can you explain that, Mr. Jenkins?

Mr. Jenkins—I can explain it very readily. Mr. Hayward has not seen me yet. (Renewed laughter.)

The President—Mr. Allen, can you give us any pointers in this line?

Mr. Allen—Mr. President, I do not know that I can. I might say some things on the subject that would be pretty hard to get into a book. (Laughter.) So I believe I will tell you one. One time a lady was going away from home for a month—I knew she was going; when she came back a good sized bill was presented to her for gas consumed during this month. She insisted that as she was away from home, and the house was locked up, she ought not to pay it. I said to her, "If you have not used the gas we do not want your money, but we have tested your meter and have smelled around for leaks and could not find anything out of gear." After I had completed a little private detective work in the neighborhood, I handed her the bill, and she said, "I reckon I have to pay that." I told her I thought so, and then asked her if there had been no one in the house during the month she was away. She said, nobody but her sister, and she was not there at night. I told her that the gas had been used, and she said, "Well, I did not burn it." I said, "The gas was burned in your house." She asked, "Where?" I replied, "Right in that room, yonder." She said, "There must be a mistake some place." I said, "Your sister and husband slept up there every night." She said, "My sister is not married." (Great laughter.)

The President—Mr. Butterworth, we would like to hear from you on this subject.

Mr. Butterworth—Having already talked more than I ought to, I would prefer to listen and give others an opportunity. I would say, however, that I think a gas company should avail itself of every opportunity to make friends in the community in which it operates. A good friend will talk as much for you as an enemy will talk against you. If you have an opportunity to do a good turn, or to show liberality or magnanimity (for which companies are not given sufficient credit), I think we should all avail ourselves of that opportunity. I might cite an instance where I have attempted to carry out that policy in Columbus. On one occasion I noticed a tree had died in front of a man's house, and he said it was caused by our gas. I admitted the possibility, and replaced the tree. A year or two afterwards I noticed that the new tree was also dying. I mailed him a note, telling him that I noticed the tree which he had planted was dying, and if he would replace it himself and send us the bill we would pay it without his first coming to us about the matter. He never forgot that act of kindness on our part. He posted the letter I wrote him in his office, calling the attention of his guests and visitors to its contents. It did us good to that extent. About the last thing I did before I left home to attend this meeting was to write a letter to the Director of Public Safety of Columbus, telling him that I had noticed in the newspaper—having been absent from the city I had not noticed it before—that during my absence the Fire Department of our city had made a run to our works to extinguish an incipient fire, and that in turning a corner one of their wagons had broken a wheel, causing damage to the extent of $15 or $20. I said if he would kindly send me a statement of the damage, on account of that accident, we would pay the bill. The point I wish to make is that litttle things of that sort will do us more good than the cost amounts to.

Mr. McIlhenny—I think Mr. Jenkins' paper affords us a good opportunity to see and learn that in more ways than one a gas company can make itself popular in the community by doing what every gas company should do, namely, the best thing it can for itself, by treating everybody fairly and properly. But, in line with what has just been said by Mr. Butterworth, I would say I do not think any gas company can afford to do otherwise than as he has done, by taking advantage of such small things. A great deal more credit is given to an act of that kind because it is not compulsory. I think, as a rule, people are credited with doing things only when they must do them, and when an act of this kind is done voluntarily it counts for a great deal more than the mere money value to the company. I think gas companies ought to strive, more and more, to get in touch with their consumers, so as to cause the people to appreciate the valuable services they render to every community. Mr. Chairman, I do not believe there is any one industry connected with the larger cities which affords more comfort, and is of more value to the community, than the gas company. What would a city be without gas? It would stop the wheels of motion almost. It is a tremendous improvement over the forms of light we have hitherto had, and it is the cheapest form we have to-day. The old tallow dip used to give but very little light, but to-day gas is within the reach of the very poorest inhabitant of our cities. It is within the reach of the occupant of every small house, and they should be taught to appreciate it. The trouble is that small consumers, or the residents of small houses, do not realize how cheap gas is; and, as I said before, no other industry connected with city life is more valuable or more indispensable to individual comfort. Nothing else that enters a man's house is so cheap for the service it renders as gas. Now people complain at the end of the month about their gas bill, but if you will explain to them that their gas only costs them so much a day, it stills the thunder of their wrath and they can better appreciate its value. There are few consumers whose gas bills amount to over 5 cents a day. The great bulk of them come within that range, and 5 cents a day is very cheap for the comforts derived from the use of gas. It is right there, ready for immediate use, and the moment the match is lighted it is ready to perform its function. It is there at any hour in the day; they can warm or cook something for the sickroom, if they want to. There are thousands of uses to which gas can be put, and only 5 cents a day is certainly a very reasonable price for the comfort it affords. People ride on the street car and never know at the end of the month how much the street car costs them. It may amount to four or five times as much as their gas bill, but they never think of the cost; they pay for it in small sums each time they ride. The trouble with the gas is that they have to pay for it at the end of the month, and after they have used it. I think, understanding that fact, we can work up the idea that gas is the cheapest and best article to be obtained, when you consider the price and comfort, and knowing ourselves it is the best thing, we ought to try to get some benefit from that fact by enjoying the popularity which every gas company deserves.

Mr. Cantine—I do not believe there is very much to be said on this matter. The main trouble is that the gas man is too modest in asserting his rights and proclaiming his virtues. He does not know how good a fellow he is, and the people are never going to tell him. They will not flatter him by telling him what a nice, honest man he is, or what good gas he makes, or how cheap he sells it; for they think that would defeat the object they want to obtain, and prevent them from getting the gas a little cheaper. There is a certain amount of envy and jealousy in the make-up of men in this world. They suppose that the gas company is getting rich (the gas company knows better), and they think that the company ought to serve its consumers at a less price. The trouble is, we do not know just how popular we are, or in what high esteem we are held. Now, for instance, I have made some inquiries of persons whom I have seen in Steubenville about our friend "Joe." Gwynn; and everyone said he was a staving good fellow, but they would not tell him so to his face for the world. (Laughter and applause.)

The President—Mr. Thompson, the Association would be pleased to hear from you on this subject.

Mr. Thompson—Mr. President, when I saw in your copies of the programme to be presented at this meeting that "Dots and Dashes" was to be discussed by Mr. Jenkins, I was unaware whether it was to be a discussion of some method of keeping track of our street mains, or whether the dots were intended to represent the collective opinions in our favor by gas consumers, and the dashes those against us, or exactly what the idea was. But it seems to me that Mr. Jenkins in his paper has somewhat trenched on the domain of the "Wrinkle Department." (Laughter.) There is no question that the items to which he called particular attention, such as "suitable overflow gauge," "accurate register temperature," "barometric pressure," "governors" and "recording presure gauge," are not only valuable, but absolutely necessary. You cannot tell how you stand unless you have them. The aspect of the question with regard to the company's position toward its consumers is one of which, of late, I have had no particular dealings in, but I can wholly agree with the speakers who have preceded me, and, as Mr. McIlhenny suggested, the nickel-in-the-slot meter will do away with the trouble of collecting gas accounts monthly, by allowing them to be paid for at more frequent intervals. It seems to me, though, in this connection, that the opportunity for the introduction of the prepayment meter in England is greater than in this country, for the reason that it is their custom to pay accounts quarterly instead of monthly, and to that degree we have not the same opportunity to introduce it to so great an extent as our brethren across the water. Some time ago a paper was read before one of our Associations, by Mr. Tracy, who suggested, in view of some branch of our work which gas companies were little by little undertaking, we might finally have to alter our titles so as to include cold storage, and refrigeration, and a number of kindred industries, in addition to gas. It seems to me that Mr. Jenkins' suggestion here about keeping these memorandum books would make us an adjunct to the Board of Health and the society reporter as well. But I do not question with the smaller gas companies it would be exceedingly valuable. (Applause.)

Mr. McIlhenny—I want to say, in defense of myself, that my seeming reference in what I said a while ago did not relate to any device for measuring out gas at so much a nickel, but more in the other line, as to the consumer objecting to the size of monthly bills, and in order to allay their complaint to ask them how much a day it was. It is a very easy matter to divide any bill by 30, and it is surprising, even to gas companies themselves, how small the daily cost is. As I stated, if you present to the consumer, who is complaining, a statement of how much per day it has cost him to light his house, he will have very little to say.

Mr. Doherty—In a talk I had with Mr. McDonald, during dinner, in reference to the subject of leakage, he recited some very interesting facts with reference to his experience in his city, which I think he would be willing to deliver to the Association. It will prove of value to all of us, and I hope the Chair will call upon him. With reference to the keeping of a memorandum book, such as Mr. Jenkins has suggested, I have had more or less experience at the complaint window in the Columbus Gas Company's office, and have always doubted whether it was a good thing to inform the consumers whether you know about these things or not, for fear they would think you would gauge their bills accordingly. For instance, if it were known that a consumer had sickness in his family, and the consumer was aware of the fact that the gas company had knowledge of that condition, he might think that the gas company had taken advantage of it. I remember one case I had, where a consumer came down to the office because his bill jumped from

about $1.70 to about $8, and he could not understand it. I had his meter read, which special reading indicated that he was still burning gas at about the same rate. The next day we sent one of our men to his house to make a thorough investigation. The consumer claimed when this big bill was presented he had been away all the month. To convince our man that the bill was not right he took him over the house, and finally said to him, "Now, we have been in every room." Our man said to him, "Here is one room that we have not been in;" and the consumer said "No; that is just an unused room for storage purposes." Upon opening the door a flame was found burning which had been burning since the day they left home. The man came down the next morning and paid his bill, and has never entered a complaint since that I know of.

Mr. McDonald, of Louisville—Mr. Jenkins seems to admit that leakage is merely a question of pressure. In other words, if you raise your pressure you must necessarily lose more or less gas. In Louisville we have to carry 10 inches pressure, and we formerly lost a great deal of gas. But we went over the lines and found and stopped the leaks. The men making the service connections are required to report, whenever they dig down to the mains for any purpose, whether there is any leakage of gas coming through, and if there is it is immediately remedied. Three years ago, out of three openings of the main we would have two reports of leaks. We do not get a report of a leak out of 100 openings of the mains now. It seems to me a great many of the artificial gas companies, or rather illuminating gas companies, will find it pays better to stop leaks rather than hold their pressure so low. In nearly all of the cities in which gas is used for cooking, the chief source of complaint is the fact that the pressure is not sufficient to permit the cooking to be done within a reasonable time. As to how leaks are stopped, anybody here who does not know how to do that ought not to be in attendance at a gas convention. There is no need to go into the details of it.

The Secretary—Your idea of finding out why people have a big bill and informing them of it is very good; but suppose a man's bill jumps from $2 a month to $20 a month, and you cannot assign any reason, and the man, whom you know to be honest, says he has not used any more than he was accustomed to use—how are you going to satisfy such a consumer?

Mr. Jenkins—I have not assumed that we can satisfy everybody, but I say in a great many cases we can. In the case Secretary Lathrop spoke about, it is a pretty hard matter to satisfy a consumer, I imagine. Without any information, you simply have to make the best of it. The point I am raising is this: If you have information that would account for the increase in the bill, reveal it to him and try to convince him that the bill presented to him at the time was right; for there are times when you can convince him by argument and by showing him how and where he has used it. Of course, if you have not the facts you cannot convince him, and, as a rule, he will kick pretty lively on the difference between $2 and $20.

The Secretary—We have a case of that sort which I am trying to adjust now. The man is perfectly honest, and his word is as good as mine. He is positive that he has not used the gas; of course, we know that he has, because the meter shows it and the meter tests all right. I am trying to convince him of his error, but I have not succeeded yet.

Mr. Holmes—I feel that the value of this paper rests largely in the fact that it brings up some methods we have not thought of before, and from the fact that we have been trying to meet this same question in a practical way. We have always had our register clerks make a notation of all reports on the bills that were inconsistent, and those were given special attention. Where we are not able to account for the variation we either read the meter or make inquiries, or in other ways attempt to satisfy ourselves, and, if possible, the consumer that is interested in the particular case. In this way we have often been able to satisfy the consumer so that even he was willing to pay a bill that did not seem reasonable. We think now we have a plan that is an improvement on that. We found that in our meter books it is very easy for the meter reader to extend the consumption. It just makes an extension of one side of one or two figures, and they are instructed, where there is any discrepancy that cannot reasonably be accounted for, to make inquiry of the consumer as to the cause. We find this does away with the necessity of carefully examining the bills in the office, and it is done right at the time our attention is called to it, and if there is anything to be explained it can be explained at the time. We believe that would be a very practical way of reaching it.

Mr. Allen—It seems to me, where a gas bill jumps from a small amount to a very large one—where there is a decided and notable increase in the amount of the bill—the gas company (I am speaking of the moderate sized gas company, where they are not over-crowded) cannot afford to let that thing go by. If the bill jumps from $5 up to $15 or $20, I do not think I can put in a month's solid time for my company which will earn them any more money than to find out what is the matter. I believe most people who raise a racket about an undue and unreasonable increase in their gas bills are honest; I think they are conscientious when they say they do not understand them. An instance which comes to my mind now, where a month's time was spent in solving just such a case as that, and I do not believe the company could have spent the same amount of money or time in any other way that would have done as much good. Of course, every community has some members who want to give the gas company a bad name; but there are many more who want to do what is right and fair. A great many people twit us when they come around to pay their bills, but the great bulk of it is mere pleasantry and not in earnest; but if a person really thinks he is paying for more gas than he got, the company cannot afford to let it go. I believe, in 99 cases out of 100, by taking the necessary time and paying attention to the matter, the cause can be found, and when it is found the company is amply repaid for the inconvenience to which it has been put.

Mr. Hamlin—There was a time when I was more actively engaged in the gas business than I am at present; at that time my experiences were about the same as each one of you gentlemen. We had consumers in whom we had implicit confidence, who would tell us there must be something wrong, that they surely had not consumed the amount of gas that the bill indicated. In such instances it was our rule to take the meter out and invite the consumer to come down and prove it. We explained to him the workings of the meter, which are very simple. And by the way, I would say that a meter is just as accurate as a watch; no watch was ever made that would keep accurate time for 12 consecutive months, neither is there a meter that would perform accurate work for that length of time; but the meter for its purpose is just as accurate as the watch. After we had explained the workings of the meter to this consumer, we would show him the prover. As you are all aware, a child of 10 years can understand the prover. As a matter of course, the meter had stood long enough in the room to become of the same temperature as the air in the room, and after he had seen for himself the workings of the prover and the meter he would be perfectly satisfied. I remember, at the time we held a meeting here some 12 years ago, when Gen. Hickenlooper was President of this Association, the gentleman was giving his experience with regard to the workings of a meter. He said, if I remember correctly, that at least 95 per cent. of the meters that were wrong were registering against the company; that being the case, how much is it to the interest of every gas man to determine whether the meter is right or wrong? As some of the speakers have said, many of the complaints that are made are honestly made, and the proper way is to satisfy the consumer if possible. We have a peculiar instance that came under observation. We had a consumer—a thoroughly reliable man—who said to us, "We did did not burn any gas last month. I asked my wife about it, and she said, 'No, we did not burn any.'" That consumer was satisfied that he had not burned any gas, and I was satisfied that he was honestly deceived. We took his meter and proved it in his presence. He said, "I am satisfied; I will pay my bill." I said, "No; let's wait while I find out what the matter is." So I put a man to doing a little detective work, and we soon ascertained the fact that he had a daughter, who, when they were away from home, would light every burner in the house. Some time afterward I met him, and I said, "You may just as well pay that bill." He said, "I wanted to pay it the other day, and you would not take it." So he paid it. Another instance: One of the members of a law firm in our town said, "I do not understand why our gas bill is so high; I do not want to kick, but it does seem to be too much." I said, "We will find out about that; there may be something the matter with the meter." I took the meter down to the works, and it was all right. Then I told our men to watch that office. They reported to me that at all hours of the night they would see lights burning in the office. I reported the fact to the consumer. He said, "That is all right." I said, "Perhaps it is your janitor." He said, "Well, I am satisfied." So the matter dropped. Possibly three or four years after that I was coming down to the city in company with a gentleman who lives in the town, who was telling me a little of his experience. "Why," he said, "do you know that some nights we sat in that office all night playing poker." Now, that showed where our gas was going. If you will investigate all such inconsistencies, and at the same time endeavor to do it in a fair and reasonable way, and let them see that you want to do what is right, you will have no trouble at all.

Mr. Doherty—I wonder what kind of an idea it would be to collect

all these different stories and make a book of them, and when we have a kicking consumer hand the book to him. That is a pretty good idea, and I want you to all think about it. (Laughter).

Mr. Cline—You can generally get along pretty well with all the complaints that are reasonable, but a few years ago I had a case where I was stumped completely. The man was a chronic kicker. He was the treasurer of a brewery. He brought in his bill and he kicked about it. He said it was not correct and he would not pay it. I tried to reason with him the best I could. I said, "We will have your meter brought down to the office and tested, and will invite you to come and witness the test." He said, "Oh, well, I would not believe it was right even if I knew it was."

Mr. Jenkins—Let me cite an instance in the line suggested by Mr. Lathrop. A few years ago I had a case very similar to the one he spoke of. The President of the Third National Bank, in Columbus, Ga., and one of the best men in the State of Georgia, had a bill run up to about three times what it ordinarily was. He was a man from whom I had never had a complaint before. He stopped me on the street one day and said, "Mr. Jenkins, you know I never complain about gas bills, but I must kick on the last month's bill." I said, "Didn't you have some company, or something of that kind." He said, "No, not any. I did not use any more gas that month than I did any other month, and," he said, "I will stick to it." I said, "Don't pay the bill; just wait awhile." We went on talking, and, in the course of perhaps 15 or 20 minutes I said, "Have you had any sickness in your house?" He said, "Send in your bill at once, and I will pay it. My wife's sister's boy was sick for two weeks and we sat up with him every night. Send the bill in." Now, what I was thinking of in that connection is this—by arguing with the consumer, and discussing the matter with him, you will find, in 99 cases out of 100, the real cause of the supposed discrepancy, and the case that Mr. Lathrop referred to is the 1 case out of 100 where no reasonable cause can be ascertained. I want to correct a little misunderstanding on the part of Mr. McDonald in regard to one portion of my paper. I did not contend that the pressure governor will take the leakage out, but I do contend that if you will control your pressure so as to have only what you actually need at all times, and not have an excess, you will reduce the leakage materially, if you have any at all. If you have no leakage you can make the pressure as high as you please.

On motion of Mr. Penn a vote of thanks was extended to Mr. Jenkins.

The President—The next in order will be the paper entitled,

MAINS AND SERVICE: THEIR EXTENSION INTO NEW TERRITORY,

by Mr. George Light, of Dayton. Mr. Light read as follows:

The extension of mains and service into new territory is a matter that requires the most careful consideration. The field should be gone over and the future growth of the surrounding territory well considered, so that the trunk lines or feeders may be extended in a direction where the greatest benefit may be derived from them. All extensions should be made on a liberal scale, as there seems to be no limit to the new modes and contrivances for the consumption of gas, in the form of light, heat and power.

If the street or streets be wide, and there is a prospect of a street car track being laid, arrangements should be made for a double line of mains. The small lines should be laid and all connections arranged for the large trunk line which, at some future day, will be needed.

The demand for the extension of mains is, as a general rule, brought to the manager's attention by a request for gas from a resident on a street. If the street is not already illuminated by the arc light, the resident (if he is the right man) is requested to circulate a petition asking the City Council to light the said street with gas, and is urged to use his influence to have the property owners on the street sign it. If the City Council contracts with the gas company for lamp posts, the street can then be canvassed for consumers. Even if the street is already illuminated, and there is no prospect of getting lamp posts, a thorough canvass for consumers should still be made, the good points of gas being shown and explained to burners of oil and electric light.

When the list of applicants for gas has been obtained, the length of main required to reach them should be ascertained. If the number of consumers justifies the extension, that extension is soon settled, but if the number is insufficient, the street should again be carefully considered as to the character of buildings on it, the class of people occupying them, the prospect of new buildings, especially manufactories, as to whether the people own their homes, and whether the houses are piped for gas. These are a few of the items that must be carefully weighed. If the houses are of the tenement class, few and far between, not piped for gas, and owned by landlords who do not believe in spending their money on property for some one else to use and enjoy, no corner groceries with saloon attachments in the rear (they are sure customers) —with such a prospect I think the request for gas should be put off for further investigation.

There is another class of would-be gas consumers who want an extension of main to their property. They live on a side street which has but recently been opened and but partially graded. The street, at some future day, may be extended. The would-be consumer cannot afford to pay an extravagant price for service. How are you going to secure him for a consumer? One plan is to estimate the cost of the main to his property, calculate the interest on estimated cost of main for one, two or three years, as, in your judgment, it will take to build up the property on the line of extension and make it a reasonable investment. Then make the would-be consumer an offer to put in his service for that amount. Another proposition is for the applicant for gas to pay a low rate of interest on the extension until the street is illuminated by gas. If illuminated within 12 months, he has no interest to pay. If there is any way to have the street lighted within that time, he will find it.

But, after all, the best way is to extend the mains wherever there is a fair prospect for consumers. After it has been decided to make the extension, the next question is, in what part of the street is it best to lay the main or mains? This question is governed altogether by what obstructions are already under the ground. It is impossible to follow a uniform rule as to where the mains shall be laid, especially when there are storm sewers, sanitary sewers, natural gas, water, telephone, telegraph, cable, and other lines of pipes and conduits, that, in these days, are laid below the street's surface. All streets that are 50 feet or over in width, from curb to curb, or have double track electric roads on them, should have two mains.

If there is a grass plot inside the curb line there is no better place for mains; that is, if there is an established line for telegraph poles and shade trees. If the sidewalk is narrow, the main should be laid just outside the curb, in the roadway. If the catch basins for sewers are built under the sidewalk, the main line can be kept in a straight line, but if part of the catch basin is under the roadway, the main will have to be curved to pass it. A main that is laid close to the curb line affords the greatest facility for tapping for services and repairing leaks at the least expense. It is less expensive to take up a stone in a sidewalk and make a short tunnel under the curb than to take up paving and have to pay a contractor or the city the price (which is always a liberal one), to repair it. Then there are no idle services running to curb line in front of property that is not built upon. This is a very important item and makes quite a difference in the cost of the extension.

After the main is in its place, the next question is that of services. The best time to canvass the street for services is at the time of the main being laid. Property owners who had refused to sign for gas when the street was first canvassed, often agree to have a service put in when the main line ditch is being excavated in front of their property. The cost of putting in a service at this time is considerably less, as there is no loss of time for the men and no drayage on tools. The new consumer should have the benefit of this. The property owner who hesitates about having his service put in should be informed of this point.

Now, as to how far the gas company should lay the service free of charge. This is a question that every company settles according to its way of doing business. If the company wants new consumers, the cost of services should be reduced so that this expense is no objection to property owners, and yet an established rule should be maintained that will enable the company to avoid extremely long services, at its own expense, to small consumers. It is for a company's own benefit to keep a service pipe in good condition and, as a general rule, this is done at the company's expense.

But, by all means, the company should retain full ownership of service pipes from main to meter. If a charge is to be made for a service, it should be made so much per foot for excavating the ditch. That will leave the ownership of the pipe to the company. The question of ownership was an important point in a suit recently brought by a gas company against a property owner who had been burning gas without a meter. He was accused of connecting the company's service to his house pipe. The defendant produced a receipted bill from the company for so many feet of service pipe.

The Judge of the Court ruled that the service pipe was his own property, and that he could do as he pleased with it. If the bill had been made out for so many feet of excavating, there would have been no question of ownership.

Discussion.

The President—Gentlemen, this is a paper upon a subject in which we are all interested and in which most of us have had more or less experience. It should be fully and fairly discussed. I would like to hear from Mr. Penn on this subject, as much paving and other street improvements have been made in his city.

Mr. Penn—I do not know that I could add anything of any consequence in furtherance of what has already been said on this subject. It has been the custom in our city to furnish free service pipes, and we feel that it pays us to do so. We have full control of it. We extend our mains wherever we can get a consumer on an average of 100 feet of main. It does not cost us very much to lay mains in our town, as it is very easy digging, and we can very readily extend them wherever there is enough demand for them. I do not see that I can offer anything in addition to what has been covered in this very able paper.

The President—We would like to hear from Mr. Thompson.

Mr. Thompson—Mr. President, I hardly think it fair to call on a non-member all the time. Rather than burden the members of this Association by speaking so much, I prefer to listen. It is a matter of local conditions as to what distance shall be fixed upon per consumer by the gas company in extending its mains. I notice some companies have adopted the rule of one consumer to each 150 feet, counting a gas lamp as a consumer. In larger cities, I think 75 feet to 100 feet is more nearly the usual figures. We have adopted a custom in our city of requiring the consumers in sparsely populated districts to pay the whole, or a large proportion of the original cost of the main, and divide it into a number of parts equal to the number of consumers we would have at, say, 100 feet to the consumer, and refund to the parties who had paid the original amount one part for each additional consumer who might be obtained. So that they themselves, as Mr. Light has suggested, are directly interested in building up that particular locality with gas consumers. The matter of laying mains where the street pavement is not likely to be disturbed was one which was agitated in a peculiar manner in St. Louis. Several years ago, when some of the streets were first improved with wood block pavement on concrete, the announcement was made that under no conditions would openings be permitted in that pavement for two years. Of course, a stand like that would defeat its own object, because repairs to sewers and for water leaks would be absolutely imperative at times; but, with that ruling in view, our Company laid service pipes up to the curb at intervals of 50 feet on each side of the street. I think, of some 150 services, which were laid at that time, not over two or three have since been connected. It seems to me there is a very strong objection to laying services up to the curb with the idea of connecting with them later. You very seldom find a house erected at just the proper line where a service can be extended to reach the meter, and where it will connect conveniently with the riser. You very seldom find it where you can lay a pipe with just the same fall as the pipe which has been extended to the curb, and if you have to put in a riser or an elbow at that point you have a service which is very difficult to clear. Under all the circumstances it seems to me to be preferable, no matter what the character of the paving on the street, to make your extension and lay your pipe from the main when called for and not before. The distance which a company should lay free of charge is in our case regulated by ordinance. We have to lay the pipe up to the building line, which is just within the sidewalk, free of charge. Beyond that we make a small charge. It seems to me that the Judge, in the case that Mr. Light refers to, was losing sight altogether of the most important fact in the connection which this defendant had made, that he was not using service pipe line; he was using gas—that is a matter of local statute largely. In Missouri the statute provides a fine of $300, or three months' imprisonment, or both, for anyone using gas without permission of the company. It is not necessary to prove that he has used the gas; if connection exists he is liable to punishment or fine.

Mr. Light—In this case the point that the defendant's lawyer made so interested the jury that they overlooked everything else but the fact that he was connecting his own pipe up. They could not see any further than that.

Mr. Hayward—The questions of mains and service and other extensions in new territory were brought up in our State some little time ago, and as President Barker, of the Massachusetts Commission, is with us, and as the extension of mains comes under the jurisdiction of the Gas Commission of that State, perhaps he might give us some light on the subject that would be of use to us.

Mr. Barker—Mr. President, I do not think I can enlighten the Association on this particular matter. I have listened with a good deal of interest to the paper and what has been said in the discussion of this topic, because, considering the amount of money involved, the features of the law which allows us to require companies to lay mains and supply consumers are the most perplexing things we have. The law allows us to impose whatever condition seems to us advisable. Now, situated as we are, with the power to preserve to one company exclusive possession of its territory, you see it becomes almost absolutely imperative upon us to require the company to lay mains almost whenever we are asked, and it has become a matter of necessity, rather than a question as to whether or not the main shall be laid. Sometimes it is a case of a land speculator opening up new territory which he expects to cut up into house lots, and again a few consumers on a street where the houses are widely scattered, and in these days of electric street lighting, with very little prospect that the gas company will have anything to do in that matter, it oftentimes presents a very perplexing problem for our solution. Those of you who see our reports do not find much allusion to this part of our jurisdiction, because those cases usually end by some amicable adjustment between the parties seeking the extension and the gas company, with such informal supervision of the arrangement as the Board may be able to give. The question of how much consumption should be guaranteed, or how much interest should be paid upon the cost of the extension, or how it should be earned, or how many consumers ought to be sufficient to require a given extension, are all very perplexing matters. Therefore, it is, Mr. President, that I have listened with much interest to this discussion, and I have gotten some valuable suggestions, so that the discussion has proved to be more to my benefit than to yours.

Mr. McDonald, of Louisville—One feature of the paper deserves particular mention. That is where the gas company takes the service pipe into a man's cellar. In such a case the gas company has to pay for it. On the other hand, the consumer would have to pay for it. For my own part, I do not want our company to own anything inside of the lot line. When our Board of Public Works say that a street shall not be opened for five years, as they do in our district, I wait in the office until a customer wants a gas connection made. I tell him I will take great pleasure in accommodating him, and be glad to do so if he would go to the Board of Public Works and have them rescind their order with reference to opening up the street; in that event we will take great pleasure in making the service connection. When a city attempts to prevent, for a given period, the tearing up of a street for the purpose of making gas, sewer, water or underground telephone connections, an ordinance of that sort will simply break itself down. The gas company need not bother with any order of that sort.

Mr. Jenkins—Several years ago the Indianapolis Company owned the line of service and the stopcocks. The practice was to run the pipe very near to the line of the building, but the stopcock belonged to the gas company. We took out the meter of a party who had made a connection with two lead pipes and secured his gas in that way. It was a difficult matter to discover, but we landed him after a while, and the point upon which we finally put the party in the penitentiary was the fact that he went out, dug down to and turned on a stopcock which belonged to the gas company. I doubt if we could have done anything with him if it had not been for that fact that the gas company owned the stopcock. If the gas company own the stopcock and shut the gas off at that point, a man who turns it on is monkeying with something that will burn his fingers.

Mr. Cline—Our town had an ordinance providing that street pavements should not be taken up for any purposes for the period of 10 years, and it was hardly more than down when one of our 8-inch mains broke in two. I did not even ask the Commissioner for the privilege of taking up the pavement, but did it and never heard anything from it.

Mr. Allen—I would like to ask Mr. Light a question. Suppose an addition is laid out where there is reasonable ground for believing it will be built up. Would he advise waiting until a certain percentage is guaranteed before the main was laid in that district?

Mr. Light—No; if I thought it would be built up in a short time I do not believe it would pay to wait. I think it would be the best plan to run a line. That is, if there were a reasonable assurance that it would be built up soon.

Mr. Watt—Suppose a street was recently paved and the contractor who put down the pavement was under bond to the city, guaranteeing the pavement for a term (say 5 or 10) of years—suppose it become necessary for the gas company to dig into that pavement for the purpose of making a connection or making repairs; I would like to ask whether that would relieve the contractor from his bond to the city? And should the company be willing to relieve the contractor? This question came up two or three years ago in a certain city where the contractor was under bond to keep the pavement in repair for five years, and the

gas company had some connection to make where it became necessary to tear up the street. The city called upon the bondsmen of the contractor to put the street in repair, and, of course, they refused. Now, in that case, who would be responsible? It is a peculiar point—one which I do not think has ever been brought up in the court; yet it is a point apt to arise at any time and which should be considered.

The President—There is hardly any question but that the contractor would be released so far as that particular damage is concerned at that particular point or place. I do not think you could hold the contractor for the damage committed by the gas company, any more than you could hold anybody else, unless it might be that it was done with their knowledge. The only question would be, who would pay for it?

Mr. Watt—So far as the bondsmen are concerned, you could not release them as to one part of the pavement without releasing them as to the entire street.

Mr. Gwynn—I hardly think a Court would decide it in that way.

Mr. Light—At Dayton, the Board of Affairs have a printed form which you have to take to the contractor and get him to release that particular part of the street. All of our streets are under bond for five years, and you have to get the contractors to release that particular part and make your price with them.

Mr. Watt—Suppose you want to go beyond that, and tear up the street without his permission?

Mr. Gwynn—I think in a case of that kind it would release the contractor; but then the contractor could go back on the gas company, if there was any law by which he could reach them.

Mr. Light—I remember a case in our city where we found a very bad leak. I went to the city Board of Affairs and asked their permission to tear up the street. They refused point blank, and would not permit it to be done. I said, "All right; we will hold you responsible for any damage occasioned by the leak." They soon sent word to me that they would grant me permission to repair the leak.

On motion of Mr. Butterworth a vote of thanks was extended to Mr. Light for the valuable paper above read.

A Dip into the Question Box.

The President—Gentlemen, we have to adjourn at 4 o'clock, in order to accept Gen. Hickenlooper's invitation to visit the new retort house of the Cincinnati Gas Light and Coke Company; and as it is very near the time for adjournment, we will not take up any more papers this evening, but will put in what time we have on the Question Box. The next is question No. 4, which is as follows:

> "What weight of water is produced by the complete combustion of 1,000 feet of 20-candle power coal gas; of 1,000 feet of 20-candle power water gas; of 1,000 feet of natural gas?"

Is there any gentleman in the room who will answer that question?

Mr. McDonald—Natural gas of the ordinary analysis, that is, about 94 per cent. CH_4, will make about 96 pounds of water per 1,000 feet, and 20-candle power coal gas will make about 75 pounds of water to the 1,000 feet, depending upon the analysis. When it comes to 20-candle power water gas, I do not know exactly what illuminants are considered, and I could not answer the question. But I would say at a guess that would be about 5 or 6 pounds of water per 100 feet, or 50 or 60 pounds of water per 1,000 feet.

The President—Gentlemen, if no one else in the room is able to give us further information on this subject, I will read question 5, which is as follows:

> "Which is a cheaper enricher for coal gas, 63° naphtha, at 5 cents per gallon, or Bear Creek cannel coal, at $4.40 a ton?"

Mr. Butterworth, you have had a good deal of experience on the subject of enrichers, and we would like to hear from you.

Mr. Butterworth—I cannot tell you anything which will prove of very much value on this subject. It is very difficult to determine the relative values of naphtha and cannel for enriching purposes. It is a very difficult and complicated problem, chiefly because of the questions as to the value of residuals derived from the cannel. But I would say, in answer to the question, that I should think Bear Creek cannel would be the better enricher of the two, under the conditions stated.

The President—Mr. Light, we would be pleased to hear from you on the subject.

Mr. Light—I do not know that I can give any figures as to the difference in the two. I think differently from Mr. Butterworth, though. I think oil is the better enricher.

The President—Mr. Dunbar, won't you give us the benefit of your experience? I know I have heard of you a number of times in meetings of the Western Association, and we would be pleased to hear you now.

Mr. Dunbar—Mr. President, I am enjoying this meeting and receiving much profit from it; but I came here to listen more than to talk.

The President—Mr. Thompson, we would like to learn something from you on this topic.

Mr. Thompson—I would say, Mr. President, while I have had no experience with this Bear Creek cannel, yet I should think it would be a question of how high you wanted to carburet your gas. If you are attempting to make a high candle power, the naphtha would be better, but for a lower illuminating power I think it would be questionable as to which is the better.

Mr. Jenkins—I think it is more of a local question than anything we have had before us to-day. It depends upon the condition of your works and what your works are composed of. If you have a good water gas plant, and a poor coal gas plant, it may be cheaper to use 5-cent naphtha. If you have no water gas plant, or a poor water gas plant, and an extremely fine coal plant, it unquestionably would be better to use the Bear Creek cannel. If you have both plants, and they are in extra good condition, then it is a local question with yourself, and I think it really resolves itself after all to a question which each man will have to figure out for himself, depending upon local conditions and circumstances.

Mr. Doherty—As it appears to me I should not think it would be much of a local question, for, as the question reads to me, I think the person has in mind a coal gas plant and not a combination or water gas plant. If the gas men were to calculate their yield in candle power hours instead of in so many cubic feet, at a certain candle power, they would be more apt to get at the real facts in a case of this sort, and not be at sea when the matter is brought up for discussion. Of course, the by-products affect it a good deal when it comes to the use of cannel. Then it is a question of how much tar is produced from the oil. It is a question of how much is produced from the cannel, but I do not believe anybody wants to figure it down to a real fine point. My own private opinion would be, with nothing really to base it on, that cannel would be cheaper if the gas were carbureted to, say, 18, 19 or 20-candle power. I do not think there is much of a local question in it.

Mr. Nash—I have had some experience in Bear Creek cannel as an enricher, but not with naphtha. As the preceding speaker said, I would judge it would be preferable to use Bear Creek cannel, if you do not want to get too high candle power, say, over 18-candle power.

Mr. Holmes—We have never had any experience in the grade of cannel coal referred to here, but the question came up with us and went through a practical experiment. With the cannel coal costing us $2.50 a ton delivered, and the oil costing about 3.43 cents per gallon, we found we saved between 1 and 2 cents per 1,000 feet, taking into consideration the bi-products and everything by using cannel.

The President—If there are no further remarks upon this question, I will read Question 6.

> "What is the drop in candle power of 20-candle power coal gas, in zero weather, between the station meter and the consumer's meter two miles distant?"

Mr. Doherty—As I understand, he wants to know the loss in candle power, and he gives the temperature in zero weather; but he fails to give the temperature of the gas at the works and at point of delivery.

A Member—It is presumed to be about 60° at the works.

Mr. Doherty—But that is simply a presumption; and it is a presumption to assume that it is going to remain at 60°, or anywhere near it, because we all know that some services freeze up, and that some portion of the gas gets below 32° in temperature; then the kind of gas would have a great effect upon it. I would consider the question is very indefinite. Of course, the skin friction would cut some figure. If the main was large and had few bends the deterioration would not be so rapid. If the illuminant consists of hydrocarbon vapor, and there was a great fall in the temperature with a consequent loss from skin friction, there would probably be considerable fall in candle power. Just what it would be I would not attempt to state.

Mr. Coombs—In our experience, in a practical test for one mile, we found that, in that distance, using ordinary coal gas, the drop was about one candle.

The President—And 20-candle power coal gas at the meter when made and put in holders?

Mr. Coombs—No; it was not. About 18-candle power.

The President—Gentlemen, from my experience in this matter I will state that, in the use of 20-candle power coal gas, I have found that it dropped about 1¼-candles. I have tested it at the works between two

holders, where the gas was made and put in a holder, and afterwards allowed to stand and cool, and have found that it dropped in candle power, from 60° F. to zero, 1½ candles.

On motion the convention then adjourned until Thursday, March 19th, 1896, at 9 o'clock, A.M.

SECOND DAY—MORNING SESSION.

EXECUTIVE SESSION.

The President, in calling the Association to order for the opening proceedings of the second day, which were commenced at 9:30 A.M., March 19th, announced that, in accordance with the programme, the Association would engage in an executive session. The debate was carried on without the presence of a stenographer, and the discussion was unrestrained. The executive session was adjourned at 11 A.M., when the regular order was then continued.

A QUERY RESPECTING ACETYLENE GAS.

Mr. Osius—I would like to call the attention of the Association to a letter I received from a prominent railroad man. He asks: "Could you furnish me with a small tank or cylinder, suitable for storing acetylene gas under high pressure? I want to try this gas as an experiment for a locomotive headlight instead of oil. Should think a tank or cylinder 12 inches in diameter and 6 inches long would hold enough gas under the usual pressure to last several weeks, and in this form could be inclosed in the back of the headlight case as easily as the oil tank. Can you furnish me names of some manufacturers or dealers in acetylene gas? Yours, etc." Now, I suppose the only question that could be intelligently answered here would be as to the names of some manufacturers or dealers in acetylene gas, because the other question I think is not an inquiry which requires an answer at the hands of this Association.

The President—Can any gentleman present give any information on this subject?

Mr. Templeton—I tried to purchase an apparatus, to be used by a friend of mine who was building a fine country house, who wanted to put in an apparatus of that kind to illuminate the building. I inquired of the people making the apparatus, who informed me they were not in shape to sell anything of the sort as yet; and, so far as I can understand, all they are selling at present is patent rights.

A Member—And stock.

The President—I agree with Mr. Templeton in thinking the business is now confined to the sale of State rights and stock.

Mr. Barker—In respect to the matter of selling acetylene gas in cylinders liquefied under high pressure, I think I can safely say that that scheme of distributing the gas has virtually been abandoned by those who are at the head of the acetylene gas business in this country. That is the information which comes to me very reliably indeed, through some of the best known gas men in the city of New York, and I am satisfied that it comes directly from the people who are at the head of the acetylene gas business in this country. The very serious accidents which have happened in attempting to handle acetylene gas in cylinders, and its very high explosive power, and the very great facility with which the gas itself dissociates, has virtually led these people to abandon that method of distribution, and they are now experimenting as to the distribution of it through pipes, in the same way as ordinary illuminating gas is distributed. They have a small experimental plant, in a village not far from the city of New York, where they are undertaking its distribution in that way, but I think it is safe to say that the scheme of distributing it in cylinders has virtually been abandoned.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Mr. Boyle, of the Committee on President's Address, then submitted the following report:

Mr. Boyle—I tried to get my co-committeemen to sit up with me until 1 o'clock this morning, but I could only get them to stay until 12; consequently, they got up this morning and finished the report—what there is of it—and the rest of it I will have to ask you to receive by word of mouth. Nothing could be more fitting in connection with the holding of our Twelfth Annual Meeting, in the city where the Association had its birth, than to have for President one who has been untiring in his efforts to make it a success. The address submitted to your Committee is full of valuable suggestions and shows that our President has been alive during the past year to all the matters relating to the gas industry. In relation to increase of membership, I understand there are quite a number of gas companies in the State not represented in the Association, and the Committee think, under the suggestion of the President, an extra effort should be made, by a Committee appointed for that purpose, to have every gas company in the State represented in this Association, and that the Committee take up the matter with the Secretary, and have printed and sent to them a request to that effect, together with that portion of the President's Address. Also, it might be well to get a list of directors of each company and send to them the papers that were read here, or send a copy of the GAS JOURNAL containing the published proceedings, to the directors and officers of each gas company not represented in our Association, thus causing them to think it is to their own interest to join us. If we can get them interested, and let them know it is to their interest to belong to this Association, it will not be very long until each company is represented. The subjects of improved gas burners and the manufacture of calcium carbide interest us closely, and we urge our incoming President to keep himself fully informed on these matters during the next year, in order that we may have everything new on these points presented at our next meeting. The important matter in connection with the report comes under the two heads of legislative matters and taxation. We commend with particular emphasis that part of the address devoted to "legislative matters," and declare with him that action and responsibility for the results in such matters have been forced upon the few in the past; that burdens resulting therefrom, although light when equally borne, have been very unequally distributed; that annually, legislation conceived in ignorance seriously threatens our mutual interests, requiring the prompt action and the united efforts of our entire membership in protection of the hard earned rights, privileges and property belonging to us. As a remedy for this unfair condition we recommend that a permanent Committee of three members be appointed at this meeting, that such Committee be known as the "Advisory Committee," the appointees to serve for a term of four years—the duties of such Board to be to watch over and protect the rights of the general gas interests of Ohio in matters relating to State legislation. Now, a word in reference to that, Mr. President. Under our organization I have no doubt this would require a change in our Constitution. The Constitution only provides for one Committee—an Executive Committee; but, inasmuch as amendments can only be made to the Constitution by having the Executive Committee present them at the first session of the meeting, it will be impossible to have any change made in the Constitution at this meeting; so the thought has been in the mind of your Committee that it might be well to appoint this Advisory Committee for one year, and then we will be in shape to take the matter up at the next meeting, and enact whatever action may be necessary in the change of the Constitution.

The President—That would come under the head of Special Committees, the same as other Special Committees.

Mr. Boyle—Yes, for this year; but thereafter we think it should be a part of the permanent organization of the Association, and be a permanent and fixed Committee from that time. It would not matter much this year, inasmuch as our Legislature adjourns in April, and will not be in session again for two years; so that they could simply keep themselves informed, during this year, of matters that might possibly come up and be discussed, and then, next year, when the matter comes up before the Executive Committee, have it fully discussed and the Constitution changed.

The President—The Ohio Electric Association has a similar Committee, elected annually. At our last meeting at Columbus, January 20th, they wanted to know whether the Ohio Gas Light Association had such a Committee, and, if so, whether the two Committees could not work in harmony. I stated to them that we had no such Committee as yet, but anything that was done which would further the interests of the gas industry would be sustained by this Association, and that the Ohio Association would go back on nothing that was done in harmony with their interests.

On motion the above report was adopted and placed on file.

On motion of General Hickenlooper, the following members were named as constituting the Advisory Committee, provided for by the above report, for the ensuing year: Messrs. Joseph Gwynn, of Steubenville; Charles H. Welch, of Athens; and J. W. R. Cline, of Springfield.

The President—The next thing in order upon the regular programme is the paper by Mr. Henry L. Doherty, of Columbus, O., entitled

SELLING GAS.

To the President and Members of the Ohio Gas Light Association:

Somebody once said, "The money is made or lost in the retort house." I don't know who first said that, and I don't want to. I don't want anybody, their sons, heirs or assigns to be looking for me with a shot gun, so I won't tell you how wise I think that chap was. He may

have meant all right, only just did not know any better. He may have meant that it is a very easy place to lose money, but I know that that statement, as interpreted, has been a millstone around the neck of many a gas man, and it would have been better had it never been said. We can lose or save money in our retort house, our purifying house, our office, on our street mains, or, in fact, in any other place, and, judging by the reports that come from various gas works, some lose in one place and some lose in all places.

We can save, or make (which is really the same thing), in any one of the departments, but if our practice is reasonably good the amount we can save in any one or all of them, is very limited compared with the amount we can make by working our market. Our market is where we can make our money. I say, without fear of successful contradiction, that the market is generally left to take care of itself more than any other branch of the business, and that this is the branch that needs most attention from the most expert hands and heads. The average gas works is a combination of a retail and manufacturing business. It is not greatly different from any other business, and yet it is very often conducted in a very different way. Take a business that has a limited field, and the same margin of profit, and compare the manner of running that businesss. Ten chances to one you will find that they consider their market of greatest importance, and their manufacture of very secondary consequence, except as to the quality of goods produced.

Why is the gas business different? Because it is generally accepted that the proper thing to do is to keep our eye on the retort house, no matter if we are losing every bit of trade we ever did have, or ever expect to have, and because gas men sometimes lack much of being just what they should be. They hold their positions, not because they have been eminently competent or successful, but because they are the cousin, or otherwise related, to some one who owns a big portion of the works, or for some other reason that is equally good. This would be true also of other businesses, if it were not for two reasons. First, the gas business has to be pretty badly managed to be a losing business, and as long as the stockholders receive regular dividends, they take it for granted that the management is good. In ordinary lines of business the competition is so strong that the poorer managers are weeded out. Second, the owners of gas works are frequently entirely ignorant of the business, and, not knowing anything about the results obtained at other works, they have no way of knowing that their works are poorly managed; would not have the least idea how to obtain a better manager, and would not know one if they would see him.

I dare say there are many gas men, even in this State, who never attended a convention, do not read our Gas Journals, and are making gas to-day in the good old way our fathers used to make it; and I would not be surprised if the stockholders of the companies they manage, believe they own a "genius" in their gas man.

I believe that the gas man who keeps abreast of the times without the aid of Gas Journals and our Associations is a genius. I believe that the man who does not get value received for his expenses in attending the meetings of our Gas Associations is either a blockhead or a "freak," and I think the different Gas Associations would be well paid, and would confer an everlasting favor on the stay-away gas man, by trying every means in their power to induce him to attend. Very often he is deterred on account of the expense, and were the directors of his company made aware of the fact that he must attend these Association meetings, in order to keep up with the times, no doubt they would bear his expenses.

It behooves the gas business that it should be well pushed in every quarter. As, for instance, Mr. Jones moves from one town to another. His experience with gas has been such that he won't use it unless obliged to, and when he moves he finds he can get some other light, and the result is that the gas man where Mr. Jones moves to is not the possessor of Mr. Jones' business. Again, Mr. Smith visits his brother, who is supplied with gas in a very unsatisfactory manner, the result being that Mr. Smith is partly prejudiced against gas and inclined to think it a very poor means of obtaining light, and may make his local gas man some trouble or lose him some trade. From these arguments, and others that might be made, I would conclude that a reasonable amount of time and money could be well spent in an endeavor to bring the stay-at-homes into the fold.

But what has the foregoing to do with "Selling Gas?" Much. Everything has a bearing on that. The quality of the gas, the regularity of the supply, the accommodations afforded our consumers, all have considerable to do with "Selling Gas." We want our customers always to have a good impression of gas and gas men, no matter where they go or where they come from. We want them to use gas in every possible place, and every gas appliance that is good is an active advertiser wherever sold. Everything is apt to have some effect on our market. Of course the question is, how to develop our market. I, nor no one else, could tell just how to do it, but among the ways for doing it are the following:

1st. Send out good gas.

2d. Send out gas of uniform richness or leanness, whichever our custom may be.

3d. See that our customers have a constant supply at a constant pressure.

4th. See that they have ample pressure.

5th. See that they are annoyed as little as possible, and that they get fair and civil treatment from every agent of our company who comes in contact with them.

6th. See that they are posted on how to save time and trouble, by using gas cookers, heaters, self-lighting burners, electric lighting burners, water heaters, nursery burners, instantaneous water heaters, etc., etc.

7th. Head off competition.

8th. Get the confidence of our consumers, so that they will consult us on their gas matters, and let them understand that we are always glad to hear from them.

9th. Convince them that gas is the best thing for light and fuel.

10th. Keep the local newspapers on your staff; also the officers of the municipality.

11th. Do not draw the purse strings too tight when opportunity presents itself for us to educate our market to our benefit.

Now, you say, "That's all right; but how are you going to do these things?" The first two are easy. Send out good goods of a uniform quality. We ought to be able to do that, and if we can't we had better get some one who can. The third one is not so easy, but we must do the best we can and remember that we are here to stay, and can probably afford to remedy the defects in our distribution system, even at considerable cost.

The fourth, to some of you, will look a little odd, but I am thoroughly convinced that many gas consumers suffer from insufficient pressure.

The advice contained in the fifth is sometimes hard to follow, as our means of knowing just what our men do are limited; but we can let them distinctly understand that they are to annoy customers as little as possible, and, when complaints are made, we can emphasize this fact in an appropriate manner.

We can follow out the sixth sugestion by pamphlets which anyone can easily get up, and see that our market is well covered with them.

"Head off competition." That is sometimes a pretty hard thing to do, and of course there is a limit as to how far it pays to do it. Imperfect service sometimes produces competition, and no doubt good service helps to prevent it. There are other ways to head off competition and each case requires special efforts, but the thing to do is to leave not a stone unturned.

How to follow out the advice contained in the eighth suggestion is not hard. The mere fact of our assuring our consumers that our interests are mutual, and making it a point to interest ourselves in their gas affairs, will go a long way to establish their confidence in us. To make them believe that gas is "the thing," can only be done by carrying out the foregoing, and by agitating the subject; and very often if we can convince one man he will convince many more.

"Keep the newspapers on your staff and also the city authorities." Now, how to do that is sometimes a problem. I want to repeat a little history that has some bearing on this subject. One of our banks that enjoyed a good reputation for soundness, etc., was reorganized, and the reason given was that the stock had gradually fallen into the hands of parties who had no influence for the bank's good, and it was desired to reorganize, and distribute the stock among those who would be able to help the management of the bank. I thought this pretty sound philosophy and it struck me that this same plan could be adopted by many gas companies. This is impressed more strongly on my mind every day, by the fact that many merchants who don't patronize us, own stock in the electric light plants, or else those who have great influence with them do. Don't you think that you could interest those who can have great influence on your business by urging them to invest in your stock? Say you would go to the managers and proprietors of your newspapers with such a proposition is this: "I have a few shares of gas stock to sell you, on the following terms: I will take your note, secured by indorsing the stock over to me, with interest at a rate less than the earning capacity of the stock, with privilege of paying it at any time, upon giving 60 days' notice."

To be brief, it should be our business to try to keep the stock of our companies distributed among those who are in a position to promote the welfare of our business. It might in some cases be a bad thing to have our stock in some people's hands, as they might use it wrongfully, but local conditions govern this and that is what our judgment is for.

Of the gas appliances now on the market there are many that are excellent weapons. We can use them to create new business, hold what we already have and draw from our competitors. How to create new business depends considerably on local conditions, but we can work the fuel trade for power, heating and culinary purposes, and we can work them to an almost unlimited extent. Gas engines are not extremely heavy gas users, but they make a desirable trade to have, and we may reasonably expect great increase in the number of gas engines in use. Their high price excludes their rapid adoption, but the fact that gas engine factories are springing up all over the country will tend to increase their sales, and competition will cheapen and improve them. The agitation about gas moters for street cars and horse less carriages, will help the gas engine considerably, even though it should never be used in this country for these purposes, as it attracts the attention of power users to their merits.

Gas engines, when compared with steam engines, can almost be said to be infants, not because they are of recent date, as the gas engine in some form or other is quite old, but, considering the study and attention the steam engine has received, the gas engine is comparatively new. In the event of the consummation of the gas man's dreams of fuel gas, the gas engine is bound to almost totally displace the steam engine, as even now, the gas engine can produce at least five times the mechanical energy that the steam engine can with an application of the same number of heat units. In other words, figuring both on the same basis, you can transform 20 per cent. of the heating power of the gas into mechanical energy with the gas engine, while you receive not over 4 per cent. in the form of mechanical energy when the steam boiler and engine are used. Gas engines can be used in a great many places cheaper than steam engines, and we have not worked our market as hard as we might, until we have no such places left in our city.

Gas engines could probably more easily find a field in doing elevator work at present than in any other direction. They probably could not be used to advantage for this purpose direct, but the elevators can be worked direct by hydraulic power and gas engines be used to pump the water to the elevator storage tank. Gas engines can be used to advantage in many places where they are not now used. I might make special mention of their field for ventilation and refrigerator purposes.

In connection with the use of the gas engine for elevator work, I wrote several manufacturers, and, from the tenor of their replies, I would conclude that they are not friendly to the gas engine and only use them when no other power is available. They all report having installed some elevators operated by gas engines and that all such plants work satisfactorily.

Heating dwelling apartments, offices, etc., runs your consumption up more quickly than anything else, but the worst foe you have to contend with in this field is imperfect gas heaters. No odor, or bad effects on health should be produced by the products of the perfect combustion of well purified artificial gas, but you will find it a very hard task to convince some people of this fact, who have had some experience with a heater that consumes gas imperfectly.

There is no reason why an ordinary apartment cannot be satisfactorily heated with gas and the products of combustion thrown off into the room. I will not encroach on your time by making a long argument on this subject, but can probably refer members of my audience who are incredulous on this point to men who can convince them. If we must use gas as ordinary fuel is used and carry the products of combustion to the outside in the ordinary method, we must sell gas very cheap if we expect to keep the cost down to any reasonable figure.

Water heating is bound to some day be an item in our fuel trade, and it is so now to a great extent. The cost of heating water is at present so high that few families think they can afford to have gas heated hot water always on tap. There is no method now that will secure this luxury at a reasonable cost, except the instantaneous water heater, and in my mind that method is not as desirable to either the consumer or the gas man as is a constant stock of hot water.

Space forbids me to give my reasons for this opinion, but my advice to the gas man is to advocate the maintaining of a constant supply of hot water. I have had little to do with water heaters and do not want to make a very positive statement about them, but will say that all that have come to my notice have proved to be rather crude affairs. They are seldom guilty of being efficient, and some of the most efficient (I mean the least wasteful, as that is the proper way to refer to them) have been so constructed that perfect combustion is impossible, and they are "perfumery" producers. I refer more particularly to those where the flame impinges directly on the cold coil. Our ordinary kitchen boilers are certainly not adapted to gaseous fuel at $1 per 1,000. Nobody is apt to replace their present boiler with a more economical one, so I would advise that the boiler be covered with a non-conductor of heat, as the radiation from it is sufficient to balance the consumption of enough gas to swell the gas bill to a "kicking degree." A very good way to insulate a kitchen boiler is to cover it with an air-tight wooden box. You then have two good non conductors, viz., wood and dead air space.

For culinary purposes gas needs no champion, for it certainly has no competitors from the point of merit, but the public don't know this; and here is another market where there is an unlimited field for your labor. You are the one to decide as to the best way to make use of gas for this purpose almost universal, and as my experience is somewhat limited in this field I would suggest that you ask those managers for pointers who have been eminently successful in this field.

Illumination was our original field, and with the introduction of prepayment meter and the recent improvement, and the possibilities for further improvement in light-producing appliances, we should virtually control this field from now on. Even barring the Welsbach light, we can increase our sales for this purpose by fixing a higher standard of illumination. I know that the Welsbach light is regarded by some gas men as a foe to their interests, but I believe that gas burning appliances cannot be made too efficient for the ultimate good of the business. In Columbus the Welsbach light has cut our sales of gas down considerably in some quarters, but on the whole we figure that the Welsbach light is increasing our sales immensely. Merchants who would not use open tips or other gas lamps use and praise the Welsbach light. Stores are lighted more brilliantly than ever before. We originally induced some merchants to light their stores up very brilliantly, and the result is that a merchant is now behind the times who does not light his store to a degree of brilliancy that would cause any returning Columbus "Rip Van Winkle" to pull the hook for the fire department. Next year we want them to light their stores more brilliantly still. In other words, we are trying to induce each merchant to endeavor to excel all other stores in the town in the brilliancy of his illumination. We tell them that store and window lighting is one form of advertising, and that it is the form that pays the best and gives the greatest satisfaction. Most of our stores keep open but one night in the week, but we have a number of store windows in which the lights are arranged on a by-pass, and can be turned off and on from the outside. They run every night in the week, and the night watchman turns them out at the time the proprietors think best. I always advocate that they be left going until the theaters are out and cars have stopped running; and I would be under everlasting obligations to any member of this Association who will tell me of some argument I can make to show that they should be lighted all night.

This is one of the ways we create illuminating business, and I recommend it to all. I have some stock arguments on this subject that I will let out on royalty, and I assure you they are not disabled by wear.

The little self-lighting burners are not to be despised. They are a friend to the gas man for these reasons:

First. They add greatly to the convenience of gas.

Second. Their cost is within the reach of all.

Third. They are gas consumers, a little for each one, but in the aggregate sufficient to make a noticeable difference in your consumption, if you have many out. They burn from one-twentieth to one-seventh of a foot per hour, and they probably average at least 18 hours per day. Now, say you have 8,000 of them out; at minimum consumption, that means nearly 8,000 feet per day. At one-seventh of a foot per hour it would mean 20,000 feet of gas per day—not to be despised by any means. The Welsbach light is unhandy to light, and it is an easy thing to sell a by-pass with at least half of them. If you have the agency for the Welsbach light in you town I would advise you to push the by-pass with it. If you do not control the agency of your town you could make it interesting to the agent to sell by-passes.

The Welsbach light and the prepayment meter are, I believe, the only means of our meeting the competition of the oil lamp. The prepayment meter makes it possible for us to extend our dealings with unreliable consumers without great risk. A prepayment meter costs more than an ordinary meter, and if we choose we might charge a fixed rent for a meter of this kind. I believe the prepayment meter does not get

its just deserts at the hands of the gas men in this country. They do not seem to regard it as anything but a toy. It deserves more recognition and is a valuable friend to the gas man who wishes to increase his output. By its use gas will supersede coal oil in places where unreliable persons cannot afford to make a cash deposit to secure the payment of their bills. Where coal oil is used for a strong light, or for artistic effects, we must push the Welsbach light, drop lights, stand lights, etc.

We need a good outside lamp that is artistic in appearance, will not blow out when by-passed, is low in cost, and made to cover the needs for bracket, post and portico lamps. We will then have another large field to work. Street lighting should also again become the gas man's property, as with the Welsbach light we can, to put it mildly, compete with electricity.

I am hoping for some modern genius to greatly improve the Welsbach light and reduce its objectionable features, by applying the recuperative principle to its construction, and I predict that this will eventually be done, as the only thing that prevents it is the difficulty of obtaining the proper mixture of oxygen and gas previous to combustion. As the lamp is now constructed, a non-lighting back arrangement is used, which prevents the gas from igniting at the point where the primary air is admitted, on the same principle that is applied in the Davey safety lamp, viz., the subdivision of the flame, so that it cannot pass in a certain direction, because the minute subdivision enables the metal to reduce its temperature below the point necessary for ignition. Should the recuperative principle be successfully applied, it will greatly increase the efficiency of the light for a given consumption of gas, hence the cost will be cheapened and the heat and products of combustion materially reduced.

I want to tell you some of my own ideas about working the Welsbach light. The Welsbach light is one of those things that is very pretty when in good shape, but it is about the worst looking object that I want to see when it is not in good shape. We try to keep ours up to the standard at all times, but to do this in the ordinary way is difficult. When the Columbus Gas Company was made the Columbus agent for the Welsbach light, it took the agency under many adverse conditions. The worst of these was the fact that some former users had discarded them on account of breakage, and this fact was a public secret among many merchants. We tried every way to assure prospective users that they would not be troubled with any great amount of breakage, but we found it difficult work. We then conceived the happy plan of cleaning and maintaining their lights at a fixed charge per month, and if you want to adopt the nicest plan possible to increase the number of users, and give all the users complete satisfaction, you should do the same.

Our rates for this work are as follows :

100 or more	.....	10	cents	per lamp	per month.
90 "	.....	10½	"	"	"
80 "	.....	11	"	"	"
70 "	.....	11½	"	"	"
60 "	.....	12	"	"	"
50 "	.....	12½	"	"	"
40 "	.....	13	"	"	"
30 "	.....	13½	"	"	"
20 "	.....	14	"	"	"
15 "	.....	14½	"	"	"
10 "	.....	15	"	"	"
5 "	.....	20	"	"	"
Less than 5	.....	25	"	"	"

For this sum we change these chimneys and shades as often as necessary, and keep up all renewals. We require that lights be put in good condition before we take charge of them. We use glass chimneys exclusively and put on clean ones at least once a week. We now take care of about 1,000 lights and we change chimneys on one-sixth of that number every day. The stores we change Monday are inspected Wednesday and Friday. The stores we change Tuesday are inspected Thursday and Saturday, and so on through the whole list. We find that the oftener chimneys are cleaned the oftener they break. We put clean chimneys on each light on our change days, and when we inspect we renew what mantles are necessary and change such chimneys as have become soiled or clouded. We now clean our chimneys by hand, but I am figuring on building a machine to do it. We carry our chimneys and shades in boxes, such as I have here on exhibition. We are more than pleased with this scheme, and it overcomes what proved to be serious objection offered by the merchants whom we were anxious to count among our customers. It enables us to have at least this many lights in first-class shape all the time and they prove an excellent advertisement for us. We don't hear any kicking, and we are not in constant fear of our patrons losing their temper and ordering our lights out. One of the largest dry goods houses in our city uses Welsbach lights (by the way, there are no large dry goods houses that do not.) One Saturday night, when they came to light up, they found that the painters who had been working in the room that week had broken 11 mantles. This irritated one member of the firm to such an extent that he talked of throwing them out, in spite of the fact that they could spend that much money on them every week, have a better light than they had before introducing them, and still save $600 per year. We never lose a consumer now on account of breakage, and we do not advocate that mica chimneys be used, as they discolor readily, are hard to clean, and our merchants will not throw them away as long as they stand up in the gallery. When we buy mica chimneys we get the 3-piece, as they are strong, cheap and practically as good as the 1-piece and better than the 2-piece, as the metal binders can be placed directly behind the perpendicular rods of the chimney. Improvements in glass chimneys will be greatly appreciated by Welsbach agents. I have some chimneys here for inspection which seem to have passed a severe test. Were they all capable of withstanding such conditions as these did, our lives would be much happier. If the breaking of a chimney meant the chimney alone it would not be such a serious matter, but the mantle is broken by the pieces of glass falling in on it. I cannot comprehend why the Welsbach light is not so constructed as to prevent, in a great measure, the breaking of mantles by the pieces of broken chimneys falling in on them. I wrote the Welsbach Company, several months ago, suggesting that they support the chimney from the inside as well as the outside, and run the supports clear to the top of the chimney. Their reply was that they had a better plan in view. I have not yet seen it, and am very sure my plan would have beaten *nothing* very easily.

[To be Concluded.]

[A paper read before the Society of Gas Lighting.]

Notes on the Foundations of the Mutual Company's New Gasholder Tank.

By Mr. Walter A. Allen.

As most of the members of the Society are doubtless aware, the New York Mutual Gas Light Company is building a large gasholder, with a steel water tank, and I think some description of its foundations, finished in October last, and which are unique in points of strength and construction, will interest the Society.

I may here mention that the Camden Iron Works are busily engaged in erecting thereon, for the Company, a 4½ million foot holder, after the most approved style.

As the necessity for the permanency of station gasholders in large cities is an ever growing one, and holds its own admirably against all rival means of lighting and heating, and will probably never be affected by the legislative threat of relegating all gas works to the suburbs, it is sound principle, as well as economy, to build the foundations for all time, disregarding, in a measure, first cost, and placing strength and durability above every other desideratum.

Holding these facts always in mind, I have spared neither time nor expense, and feel that the results will bear favorable comparison with any similar work.

As is known to most of the members, through the Society's having honored me by holding several meetings here, the foundations are placed in the ground formerly occupied by four smaller holders, having brick tanks, and which necessitated their complete removal.

The diameter of the excavation was 196 feet, over the entire area of which I have had driven to 3 feet centers, 4,100 piles, from 20 to 40 feet long, as the nature of the ground rendered expedient.

These were cut off 3 feet below tidewater, leveled and capped with 12-inch by 12 inch yellow pine beams, and the latter closely floored over with 6-inch by 12 inch yellow pine planking. All of the beams were securely spiked to the piles and the spaces filled with broken brick and sand, and the planking spiked firmly in place, thus bringing 18 inches of solid timber to bear on the piles and distribute the weight they will eventually sustain.

Surmounting this, I have built a circular wall, 6 feet wide at the base, by 5 feet at the top, and 10 feet high, and battered on the outside, the wall having an inner diameter of 184 feet, and within which inclosure I have had rolled and tamped and flushed 11,000 cubic yards of washed gravel, distributed in layers not more than 6 inches thick, the whole being brought within 1 foot of the top of the wall.

This rolling in thin layers has resulted in imparting to the gravel

nearly the solidity of masonry, and is admirably calculated to prevent settlement. I finally put on top of all 1 foot of concrete made with hydraulic cement, and leveled it to grade with cement of the same kind.

The sides of the tank being the heaviest part of the superstructure, the greatest weight will come on the masonry, which has, therefore, been constructed throughout with the best hydraulic cement and by the most skilled labor, thus insuring unusual strength.

The weight that the foundations will sustain will be about 65,000 tons, and the great number of piles will insure an unusually high factor of safety, their bearing strength being about three times as great as the weight to be placed upon them, leaving no question as to their ability to bear the strain.

In building the tank entirely above ground, I have been swayed by the importance of keeping it absolutely dry, and this necessity is emphasized by our proximity to salt water and the percolations of the soil by the tide.

I have seized on this unusually undesirable condition, and have made it subordinate to my plan of construction, namely, by having all of the piles and timbers below tide water mark, which will insure their preservation for an indefinite time.

There will be two 36-inch inlet, and two 36 inch outlet pipes, and for the accommodation of these I have had two arches built in the masonry, so that the pipes will be accessible at all times from the governor house cellar, and for their entire length up to the bottom of the tank, thus insuring dryness and consequent preservation.

The cost of the foundations has been about $50,000, but I hope and feel that they will prove "a monument more lasting than brass," and that their strength will never fail the costly and graceful superstructure now rising thereon.

Regarding the construction of the holder proper, I hope to claim your interest at a later day, when I shall go into the details of the work, giving some valuable points and ideas which have recently been introduced in the construction of gasholders of this value and magnitude.

We propose to have the holder in use in November next, and I believe the general design and workmanship will compare most favorably with similar structures now in use in this and other large cities.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

MR. GEORGE W. JACKSON, has been appointed Superintendent of the Capital Gas Company, of Sacramento, Cal., vice Mr. J. C. Pierson, whose resignation was announced by us some weeks ago. Mr. Jackson has been in the employment of the Company since 1886, the greater part of which time he served it as office clerk.

THE Stockton (Cal.) Gas and Electric Light Company is still "boring" for natural gas. The latest experiment in this direction is in ground on the corner of Anderson and Pilgrim streets, and it is calculated that contact with the gas will be made at a depth of 2,000 feet.

RUMOR has it that the proprietors of the Evansville (Ind.) Gas and Electric Light Company are considering a proposition for sale of that property; and the story further goes that the would-be purchasers are the capitalists who recently acquired the gas interests of Terre Haute, Ind.

THE Michigan Peninsular Car Company, of Detroit, Mich., has placed a contract with the Berlin Iron Bridge Company, of East Berlin, Conn., for a new foundry building, 160 feet square. The building, which is to be one story high, is to have a steel framework throughout, and is so designed that the lower chords of the trusses support runways extending the whole length of the building. These runways carry trolleys having a capacity of 2,000 pounds. By means of these overhead trolleys the molten metal is conveyed quickly and easily from the cupola to any part of the casting floor.

MR. J. C. HUBINGER, of Keokuk, Ia., has, according to the Davenport (Ia.) *Democrat*, purchased a one-half interest in the Davenport Gas Light Company, and has also consented to assume the Presidency thereof.

MESSRS. T. J. AGNEW and C. B. Davison (the latter is a son of the late Mr. H. J. Davison), of this city, have obtained a concession from the Board of Aldermen of the city of Merida, Yucatan, under which they are empowered to construct and operate a gas works in the named city. The grant has also received the seal of the State Government. The Company has been organized and it is proposed to construct the plant at once. Under the conditions governing the cost of materials for gas making in Merida it has been decided to erect a coal gas works, the initial capacity of the plant to be 150,000 cubic feet per day. West Virginia gas coals of high grade (the shipping point being Newport News) cost $12.50 per ton in Merida, but coke readily sells for 25 cents a bushel there, and tar is in rare demand at 15 cents per gallon. The work of construction will be carried out under the supervision of Mr. Agnew. According to the agreement between the authorities and the Company, a maximum rate of $6 per 1,000 cubic feet may be charged, but it is likely that the initial selling price will be put at $3.50. At the present time the only central station lighting maintained in the city is that kept up by the local electric lighting company, which supplies arc lights only. Furthermore, a low grade kerosene oil costs not less than 60 cents per gallon. Merida is a city of Mexico, and is the capital of Yucatan. It is located at a point 26 miles south of the port of Progreso, which is located on the south coast of the Gulf of Mexico, at a point midway of Tampico, Mexico, and Havana, Cuba. It has a population of 60,000, and it makes important shipments of sisal, hemp, hides, deer skins, logwoods, etc., and it seems to us that a gas company there should prove a profitable enterprise.

HOUSE BILL No. 6,660, to incorporate the National Capital Gas Light, Heat and Power Company, for Washington, D. C., has been adversely reported. The objection to it is that it is considered unwise to authorize the tearing up of the street pavements for the purpose of laying a second set of gas mains, in view of the power vested in Congress to control the existing gas companies as to the quality of gas that they may sell, and as to the price that shall be charged for it.

A CORRESPONDENT at Topeka, Kas., writing under date of March 28, says: "On the 24th inst. representatives of the Emporia (Kansas) Gas and Electric Light Company and the Emporia Council met to discuss the purchase of the Company's plant and franchises, with a view to their subsequent operation on municipal account. The outcome of the discussion was an agreement to appoint a board of arbitration, which is to be composed of five members, two to be named by the Council and two by the Company, the other to be named by the four so chosen. The board will appraise the Company's property, and the value thus set will be submitted to vote to the residents of Emporia, the result of the ballot determining whether or not a company or the people of that city shall be the suppliers of artificial light therein.—C."

THE following responses were made to the invitation of the local authorities, of Charleston, S. C., for bids for the public lighting of the city, for the year beginning April 1:

"Charleston Gas Light Company—846 gas lamps, 5-foot burners, to be subject to the moon's phases, and to be lighted when the moon is overcast, provided the overcasting is prior to midnight, for the sum of $14,062.40 per annum, or at the rate of $16.62 per lamp per year. Further, the charge for gas supplied to the public buildings of the city shall not be in excess of the rate of $1.50 per 1,000 cubic feet."

The bid of the Charleston Light and Power Company was this:

"To furnish the city with 112 arc and 5 incandescent electric lights, on moontable (lights to be kept in duty during dark and cloudy nights, if the notification to the Company on such nights is made prior to midnight), for $11,130.60. Also, one arc light at the Police Station, to burn all night and every night, for $144 additional."

The bids were, with slight modification, accepted by the Committee (Messrs. G. W. Williams, Jr., Z. Davis, O. C. Beckman, Robt. McCarrell and J. F. Lillienthal), and the figures above named will rule for the ensuing year. All of which goes to show that Mr. Turner's fine negotiating hand and Mr. Turner's level head are well to the fore in the manipulation of the lighting supply of one of our fairest seaboard cities.

MR. VOORHIS, of the Nyack (N. Y.) Company, proposes this summer to increase the output of his works, on account of gas cooking service, even if he has to loan the cookers or ranges. Voorhis has done good work in the Lexow district, in that Lexow's electric lighting plant in the same district is universally condemned, so far as its service (?) goes; wherefore Mr. Voorhis should have double commendation. Secure in his monopoly of the lighting service of the place, while awaiting the advent of the bondholders to the electric company's possessions, Mr. Voorhis seeks to extend his business by ways that are bright and by practices that are modest.

THE Berlin Iron Bridge Company, of East Berlin, Conn., has been awarded a contract by the Carteret (N. J.) Steel Company, for a steel frame to support the furnaces that are to be placed in the new iron building which the Carteret folks have decided to construct.

In our issue for March 16 we noted that the firm of Messrs. D. McDonald & Co., of Albany, had instituted proceedings against Mr. Jno. Pauley, Deputy Inspector of Gas Meters for the Albany district of New York, complainants alleging that the Inspector was dilatory in inspecting and sealing the meters made ready by them for sale and shipment. Mr. Pauley's answer was that the Company made too many meters to enable him to satisfactorily comply with the law; further, that the law contained insufficient provision to direct him to supply the necessary seals. Judge Chester, before whom the argument was spoken, decided, according to our correspondent, "that the law clearly imposes upon the Inspector the duty of sealing or otherwise stamping or marking the meters which he finds correct upon inspection, and that Messrs. McDonald & Co. have a right to compel the Inspector to perform the duty imposed upon him by law; but as questions of fact are raised by the opposing affidavits, which necessitate the taking of testimony, an alternative writ of mandamus should be asked for." He (the Judge) then denies the motion of relator, without costs; which looks to us to be an easy and a simple way of begging the question.

The Northwestern Gas Light and Coke Company, of Evanston, Ills., has contracted with the United Gas Improvement Company for one of the latter's standard double superheater water gas settings, to have a capacity somewhat in excess of 350,000 cubic feet per day. The business of the Northwestern has been increasing so rapidly that the new apparatus was required to meet the demand; and also provide a means of handling the heavier grades of oil. The old apparatus (two Pratt & Ryan machines) will be discontinued.

"Chicago, Ills., March 28th, 1896.

"Dear Journal: The Kansas City gas war is on in full blast, including gas at 50 cents per 1,000 and free stoves. Patrons and expect-to-be patrons (at 50-cent gas) are tumbling over each other to secure stoves. The Missouri Gas Company proposed to turn gas into its mains to-day. The result will be watched with interest by all gas men, as both Companies are well equipped to handle a large business. I was asked yesterday this question, 'What will the outcome be?' Who can guess?——Gas matters in Chicago are very quiet. A local paper announced that the Ogden Gas Company would begin work at once upon a plant to be located on the North Side; but later on the President of the Company denied the statement.——I heard a report to-day that the Madison (Wis.) plant had been sold to Eastern capitalists, the transfer to take place April 1st.——Western gas men will extend a hearty welcome to Fred. H. Shelton over his return to Chicago.—Western Observer."

Mr. H. B. Leach, Treasurer and Manager of the Taunton (Mass.) Gas Light Company, has ordered a No. 2 Anderson main pipe cutter, which seems in the line of convincing proof that Mr. Leach is a believer in the Anderson cutter, since he has been using a No. 1 machine for two years.

Articles incorporating the "Peoples Gas Company, of Chester county, Pa.," have been filed by Messrs. James Ball, Elmer Smalling, Edwin Hand, W. S. Jamison and F. H. MacMorris. The Company proposes to supply gas to residents and corporations in Easttown and Tredyffrin townships by laying gas mains to connect with those supplying West Philadelphia.

The capitalists now in control of the gas supply of the Chicopee Falls, Mass., district, propose to make important main extensions, besides renewing and greatly enlarging the manufacturing plant. Agent Bailey also holds out the hope that the rate will be cut to $1.75 per 1,000.

The proprietors of the Marietta (O.) Gas Company have decided to put the minimum net selling rate to consumers of less than 20,000 cubic feet per month, at $1.40 per 1,000. The concession rules from the 1st inst.

The United Gas Improvement Company is enlarging and beautifying the main business offices that it occupies in connection with the management of its Jersey City, N. J., branch.

The following is the text of the decision of the Board of Gas and Electric Light Commissioners, of Massachusetts, in the instance of the Jamaica Plain petition—the decision was promulgated March 30th:

"This was an application by customers of the Jamaica Plain Gas Light Company for a reduction in price. An extended hearing, numerously attended by the petitioners, was held at the office of the Board, at which both parties were represented by counsel and the case presented with unusual fullness. The evidence then submitted has been supplemented, in accordance with the expressed wish of the parties, by an examination of the Company's records, accounts and works, and a careful study of its history, policy, present condition and prospects.

"The district supplied is a single ward in the city of Boston, occupied mostly for residences, covering a relatively large area, which is cut into by extensive reservations for parks and other public purposes. This has caused a relatively small number of consumers per mile of main, a larger outlay for capital account, and somewhat greater leakage or lost gas account than by some other sections. As this territory has steadily grown in wealth and population, the Company has made liberal extensions of its mains, and this fact, combined with substantial reductions in price, has steadily increased the output of gas.

"With the exception of that issued, in accord with the custom of the time, in part payment for the construction of the original works, the entire capital stock has been paid in in cash, and more than half the present capital has been sold by auction at such a premium that for every share now outstanding $110 in cash has been contributed to the corporation.

"A considerable debt has been created by the recent expenditure of liberal sums for improvements and extensions, and no extraordinary demands in this direction are likely to come in the immediate future.

"The principle adapted by the Board in former cases, that the Company under skillful management is entitled to charge such a price as will provide for the fair cost of manufacture and distribution, and a reasonable amount beyond this for depreciation in plant and a proper dividend, has been generally approved, and was adopted as sound by the petitioners in this case. By the assistance of those who up to recent date were in charge of the Company's affairs and responsible for its success, the petitioners were able to submit definite testimony upon the question of a fair cost, which has been given special weight because of the intimate knowledge of the Company's affairs which those giving it possessed. In this evidence, however, but little attention was paid to the cost of depreciation, although its importance was recognized. Although this is as abso'utely and essentially a part of the cost as the coal or labor by which the gas is produced, the amount necessary for it is not easy to determine, and managers of companies have not always appreciated its importance. The public interest demands the regular expenditure of a sum ample at least to maintain the structural value of the entire plant on a level with the capital actually required for its original construction, and a different policy has invariably imposed upon the public the burden of a capitalization far beyond the amount necessary for the conduct of the business. How the end is to be attained, whether by the payment of a debt resulting from extraordinary repairs or reconstruction, or the cost of minor extensions and additions, or by the accumulation of a fund, to be used either for future expenditures in these directions, or as an insurance against those accidents which sometimes result from the hazards of the business, is a quest on which can only be determined by the peculiar conditions attached to individual cases.

"The location of this Company, in territory adjacent to that in which gas is sold at an apparent profit at a much lower price, imposes upon the management peculiar difficulties, and has naturally encouraged in the public mind a conviction that a substantial reduction can readily be made. While this fact alone affords but little aid in fixing the fair price under conditions so widely different, it may have an important bearing upon the question of a wise policy in the management. It is doubtful if this consideration has been given the weight it deserves. In the face of all the facts the Company has demanded a profit from which it has paid larger dividends than before these conditions arose. In support of this course it was urged that the investment had become an especially hazardous one, and that the right of larger and stronger Companies to enter the territory and destroy the value of the stock justified the payment of large dividends while the opportunity existed. Such spirit and purpose are the prerogatives of an unrestricted monopoly only. In ordinary trade business conditions of this sort impose a conservative spirit and policy upon the management and compel a reduction in profits rather than an increase.

"That the prices in the neighboring territory can be met it is unreasonable to expect, neither was this demanded by the petitioners; but a sound business policy in the Company, looking to the preservation of its corporate integrity and its privileges, demands the closest possible approach to them, even though it involve some reduction from former profits.

"For these reasons the Board recommends that, from and after the 1st day of April next, the net price for gas supplied by the Jamaica Plain Gas Light Company shall not exceed $1.40 per 1,000 feet.—For the Board, F. E. Barker, Chairman."

The price recommended by the Board is equivalent to a cut of 25 cents in the former selling rate.

The proprietors of the Girardville (Pa.) Gas Company have reduced the gross selling price to $2, from $2.25 per 1,000. No change was made in the discounts obtainable by settling accounts 10 days after the same are presented.

Mr. Chester P. Spalding, who had been Superintendent of the Towanda (Pa.) Gas Company since 1869, died at his home in Towanda on the afternoon of March 27th. He was in his 77th year.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

EDITOR - Jos. R. Thomas, C.E.
ASST. EDITOR -T. J. Cunningham.
MANAGER-C. E. Sanderson.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 32 Pine Street, New York.

This is a recognized official organ of
LIGHT, HEAT, STEAM, WATER SUPPLY,
VENTILATION, SANITARY IMPROVEMENT,
AND GENERAL SCIENCE.

TERMS:

SUBSCRIPTION—Three Dollars per annum, in advance. Single copies, 10 Cents.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—B. Westermann & Co., of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, APRIL 6, 1896.

The Market for Gas Securities.

Everybody interested in gas shares seems to be watching and waiting upon Albany for what may come about in the shape of legislation affecting gas interests, and the result is doubt and uncertainty and inaction on the part of purchasers and unevenness and weakness in quoted values. There will be no change this year in the gas rates for New York and Brooklyn, and although it is quite likely that the Carbide Company's sweeping grant at the hands of the Senate will be assented to by the Assembly, it is also about certain that the Mayors of three cities affected by the provisions of the grant will return it to the Legislature with their objections. To repass the measure over their objections will take up at least 10 days, and even if the scheme is successfully rerushed the chances are that Governor Morton will settle it for good. Consolidated sold up to 154, in the interim of writing, and then reacted to 152, which was the figure bid for it at the close last night—Thursday. The Exchange is closed to-day. Other city shares are somewhat better, Mutual and Equitable being in good demand at a 6-point advance in each. Brooklyn securities show no marked change, 82½ being bid for the Union Company's shares. A very laughable proceeding in Brooklyn is that instituted by "Bertie" Reiss and Mr. De Fere, of counsel for the phantom Mutual Company, to have the Union Company dissolved because it purchased the rights and franchises of the Citizens Company, incorporated in 1859, the franchise stipulating that the holders thereof should not sell the same. A fair reading of the franchise, however, shows that that stipulation was only to hold for a year, or until the works were built, provided construction to that end was commenced within a year. Chicago is steady to strong, as is Baltimore Consolidated. Consumers, of Jersey City, is 82½ bid.

Gas Stocks.

Quotations by Cochran & Close, Brokers and Dealers in Gas Stocks.

35 WALL ST., NEW YORK CITY.

APRIL 6.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$35,430,000	100	152	153½
Central	500,000	50	150	..
" Scrip	220,000	..	100	.
Equitable	4,000,000	100	208	..
Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,800,000	1,000	114	.
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	225	..
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	.	..	.
Northern	150,000	50	79	80½
" Bonds	150,000	1,000	..	98
New York and East River	5,000,000	100	34	38
Preferred	2,000,000	100	70	75
Bonds 1st 5's	3,500,000	1,000	99	100½
" 1st Con. 5's	1,500,000	..	86½	88½
Richmond Co., S. I.	348,650	50	50	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	75½	77
Preferred	5,000,000	100	107	109
Bonds, 1st Mortgage, 5's	1,500,000	1,000	109	111
Yonkers	299,650	50	130	
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	82	84
" " Bonds (5's)	15,000,000	1,000	105	106
Bay State	5,000,000	50	23¾	23¼
" Income Bonds	2,000,000	1,000	..	80
Boston United Gas Co.--				
1st Series S. F. Trust	7,000,000	1,000	..	80
2d " " "	3,000,000	1,000	51½	53½
Buffalo Mutual	750,000	100	125	..
" Bonds	200,000	1,000	95	100
Central, San Francisco	2,000,000	..	95	..
Chicago Gas Co.	25,000,000	100	67⅞	68
Chicago Gas Lt. & Coke Co. Guaranteed Gold Bonds	7,650,000	1,000	94	94¼
Columbus	1,069,000	..	..	65
1st Mortgage	1,085,000	.	..	96
Consumers, Jersey City	2,000,000	100	82½	..
" Bonds	600,000	1,000	103	..
Cincinnati G. & C. Co.	7,000,000	100	203	..
Consumers, Toronto	1,600,000	50	184½	187
Capital, Sacramento	500,000	50	..	41
Bonds (6's)	150,000			
Consolidated, Baltimore	1,000,000	100	65¾	66
Mortgage, 6's	3,600,000	..	107	107½
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490,000	..	..	..
Detroit	4,000,000	..	..	29
" Con. Bonds	4,812,000	..	71½	75
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Fort Wayne	2,000,000	..	81	85
" Bonds	2,000,000	..	91½	94½
Hartford	750,000	25	..	145
Indianapolis	2,000,000	..	139	144
" Bonds, 6's	2,650,000	..	104½	105½
Jersey City	750,000	20	180	..
Lafayette Gas Co., Ind.	1,000,000	100	87	90
Bonds	1,000,000	1,000	93	96
Louisville	2,570,000	50	..	180
Laclede, St. Louis	7,500,000	100	27	27½
Preferred	2,500,000	100	86	86½
Bonds	9,084,400	1,000	95½	96
Little Falls, N. Y.	50,000	100	..	100
Bonds	25,000	..	..	100
Montreal, Canada	2,000,000	100	200	.
Newark, N. J., Gas Co.	1,000,000	..	93	98
Bonds, 6's	4,000,000	.	128	..
New Haven	1,000,000	25	225	..
Oakland, Cal.	2,000,000	..	46½	..
" Bonds	750,000	..	..	..
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	2,100,000	1,000	..	108
2d "	2,500,000	1,000	104	105
Peoples, Jersey City	500,000	50	..	175
Paterson, N. J.	.....	25	99	102
Rochester Gas & Elec. Co.	2,150,000	50	..	..
Preferred	2,150,000	50	83	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	84½	85
St. Paul Gas Light Co.	1,500,000	100	67¾	70
1st Mortgage, 6's	650,000	..	84	87
Extension, 6's	600,000	..	..	..
General Mortgage, 5's	2,400,000	..	88	90
Syracuse, N. Y.	500,000	25	..	..
Washington, D. C.	2,000,000	20	250	..
Western, Milwaukee	4,000,000	100	65	67
Bonds, 5's	3,556,000	..	88	90
Wilmington, Del.	500,000	50	188	190

Advertisers' Index.

GAS ENGINEERS.

	Page
Jos. R. Thomas, New York City	561
Wm. Henry White, New York City	559
Fred. Bredel, Milwaukee, Wis.	555
H. C. Slaney, Brooklyn, N. Y.	559
Geo. R. Rowland, New York City	559
The Western Gas Construction Co., Fort Wayne, Ind.	550
Humphreys & Glasgow, New York City	546
T. G. Lansden, St. Louis, Mo.	559
American Gas Co., Phila., Pa.	543
David Leavitt Hough, New York City	540

CHEMISTS.

Herman Poole, New York City	541

PROCESSES.

Bartlett, Hayward & Co., Baltimore, Md.	557
United Gas Improvement Co., Phila., Pa.	549
Burdett Loomis, Hartford, Conn.	558
National Gas and Water Co., Chicago, Ills.	551
Economical Gas Apparatus Construct'n Co., Toronto, Ont.	557
The Western Gas Construction Co., Fort Wayne, Ind.	550
A. M. Sutherland, New York City	545

GAS WORKS APPARATUS AND CONSTRUCTION.

James R. Floyd & Sons, New York City	560
Continental Iron Works, Brooklyn, N. Y.	558
Deily & Fowler, Phila., Pa.	560
Kerr Murray Mfg. Co., Fort Wayne, Ind.	556
Stacey Mfg. Co., Cincinnati, Ohio	559
Bartlett, Hayward & Co., Baltimore, Md.	557
Davis and Farnum Mfg. Co., Waltham, Mass.	556
R. D. Wood & Co., Phila., Pa.	558
Isbell-Porter Company, New York City	558
Fred. Bredel, Milwaukee, Wis.	555
United Gas Improvement Co., Phila., Pa.	549
Berlin Iron Bridge Co., East Berlin, Conn.	546
National Gas and Water Co., Chicago, Ills.	551
Economical Gas Apparatus Construct'n Co., Toronto, Ont.	557
The Western Gas Construction Co., Fort Wayne, Ind.	550
Humphreys & Glasgow, New York City	546
Gas Engineering Co., Pittsburgh, Pa.	556
American Gas Co., Phila., Pa.	543

SCRUBBERS AND CONDENSERS.

G. Shepard Page's Sons, New York City	559
R. D. Wood & Co., Phila., Pa.	558
James R. Floyd & Sons, New York City	560
Continental Iron Works, Brooklyn, N. Y.	558
Gas Engineering Co., Pittsburgh, Pa.	556

REGENERATIVE FURNACES.

Bartlett, Hayward & Co., Baltimore, Md.	557
Fred. Bredel, Milwaukee, Wis.	555
J. H. Gautier & Co., Jersey City, N. J.	555
Parker-Russell Mining and Mfg. Co., St. Louis, Mo.	554
Adam Weber, New York City	554

TAR AND CARBONIC ACID EXTRACTOR.

G. Shepard Page's Sons, New York City	559

AMMONIA CONCENTRATORS.

Michigan Ammonia Works, Detroit, Mich.	540
G. Shepard Page's Sons, New York City	559
Gas Engineering Co., Pittsburgh, Pa.	556

GAS METERS.

John J. Griffin & Co., Phila., Pa.	564
American Meter Co., New York and Philadelphia	563
The Goodwin Meter Co., Phila., Pa.	562
Helme & McIlhenny, Phila., Pa.	563
D. McDonald & Co., Albany, N.Y.	563
Nathaniel Tufts, Boston, Mass.	562
Maryland Meter and Mfg. Co. Baltimore, Md.	562
Metric Metal Co., Erie, Pa	561
Keystone Meter Co., Royersford, Pa.	562
The Hillen Meter Co., Brooklyn, N. Y.	563

PREPAYMENT METERS.

American Meter Co., New York and Philadelphia	563
John J. Griffin & Co., Phila., Pa	564
D. McDonald & Co., Albany, N. Y.	563

GAS AND WATER PIPES.

Ohio Pipe Co., Columbus, Ohio	561
M. J. Drummond, New York City	561
R. D. Wood & Co., Phila., Pa.	558
Warren Foundry and Machine Co., New York City	561
Donaldson Iron Co., Emaus, Pa.	561
Addyston Pipe and Steel Co., Cincinnati, O.	561

PIPE CUTTERS.

Wm. Anderson, East Boston, Mass.	541

GAS BAGS.

Peerless Rubber Mfg. Co., New York City..... 541

STEAM BLOWER FOR BURNING BREEZE.

H. E. Parson, New York City..... 555

GAS COALS.

Penn Gas Coal Co., Phila., Pa..... 553
Perkins & Co., New York City..... 552
Despard Gas Coal Co., Baltimore, Md..... 553
Westmoreland Coal Co., Phila., Pa..... 553
Berwind-White Coal Mining Co., New York and Phila... 552
Henry C. Scheel, New York City..... 553

CANNEL COALS.

Perkins & Co., New York City..... 552
Henry C. Scheel, New York City..... 553

GAS ENRICHERS.

Standard Oil Co., New York City..... 553
The Sun Oil Co., Pittsburgh, Pa..... 553
W. H. Townsend, New York City..... 553

COKE CRUSHER.

C. M. Keller, Columbus, Ind..... 553

CONVEYING MACHINERY.

C. W. Hunt Company, N. Y. City..... 541

GAS GAUGES.

The Bristol Co., Waterbury, Conn..... 541

GAS GOVERNORS.

Connelly Iron Sponge and Governor Co., New York City. 551
Isbell-Porter Co., New York City..... 558
The Wilder Mfg. Co., Phila., Pa..... 541

SELF-SEALING MOUTHPIECE DOORS.

Isbell-Porter Company, New York City..... 558
Continental Iron Works, Brooklyn, N. Y..... 558
G. Shepard Page's Sons, New York City..... 559

RETORTS AND FIREBRICK.

J. H. Gautier & Co., Jersey City, N. J..... 554
B. Kreischer & Sons, New York City..... 554
Adam Weber, New York City..... 554
Laclede Firebrick Mfg. Co., St. Louis, Mo..... 554
Cyrus Borgner, Phila., Pa..... 554
James Gardner, Jr., Pittsburgh, Pa..... 554
Henry Maurer & Son, New York City..... 554
Baltimore Retort and Firebrick Co., Baltimore, Md..... 554
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 554
Brooklyn Firebrick Works, Brooklyn, N. Y..... 554

CEMENTS.

C. L. Gerould & Co., Mount Vernon, N. Y..... 554

INCANDESCENT GAS LAMPS.

Welsbach Commercial Co., Phila., Pa..... 543

MICA GOODS.

The Mica Mfg. Co., New York City..... 540

BURNERS.

C. A. Gefrorer, Phila., Pa..... 558

LAVA GAS TIPS.

D. M. Steward Mfg. Co., Chattanooga, Tenn..... 540

GAS TUBING.

J. C. Granger, New York City..... 541
Wm. M. Crane & Co., New York City..... 544

PURIFYING MATERIALS.

Connelly Iron Sponge and Governor Co., New York City 551
Greenpoint Chemical Works, Brooklyn, N. Y..... 551
Henry W. Douglas, Ann Arbor, Mich..... 551

EXHAUSTERS.

The P. H. & F. M. Roots Co., Connersville, Ind..... 548
Isbell-Porter Company, New York City..... 558
Connelly Iron Sponge and Governor Co., New York City 551

VALVES.

Ludlow Valve Manufacturing Co., Troy, N.Y..... 550
Chapman Valve Manufacturing Co., Boston, Mass..... 550
R. D. Wood & Co., Phila., Pa..... 558
Continental Iron Works, Brooklyn, N. Y..... 558
The P. H. & F. M. Roots Co., Connersville, Ind..... 548
Isbell-Porter Co., New York City..... 558
The Western Gas Construction Co., Fort Wayne, Ind.... 550

ELECTRICAL APPARATUS.

Wm. Henry White, New York City..... 559

GAS ENGINES.

Otto Gas Engine Works, Phila., Pa..... 534
The American Gas Engine Co., Phila., Pa..... 542
Backus Water Motor Co., Newark, N. J..... 500

ENGINES AND BOILERS.

The Hazelton Boiler Company, New York City..... 541
W. G. & G. Greenfield, East Newark, N. J..... 541

PURIFIER SCREENS.

John Cabot, New York City..... 555

GAS STOVES.

American Meter Co., New York and Philadelphia..... 547
The Goodwin Meter Co., Phila., Pa..... 562
George M. Clark & Co., Chicago, Ills..... 545
Maryland Meter and Manufacturing Co., Baltimore, Md.. 562
William M. Crane & Co., New York City..... 544
Keystone Meter Co., Royersford, Pa..... 562
A. Welskittel & Son, Baltimore, Md..... 544

CHINA GAS KILNS.

William M. Crane & Co., New York City..... 544

GASHOLDER PAINT.

New York Marine Paint Co., Poughkeepsie, N.Y..... 550

RED CEDAR TANKS.

Williams Mfg. Co., Kalamazoo, Mich..... 501

GASHOLDER TANKS.

J. P. Whittier, Brooklyn, N. Y..... 550

GASHOLDERS.

Bartlett, Hayward & Co., Baltimore, Md..... 557
Continental Iron Works, Brooklyn, N. Y..... 558
Deily & Fowler, Philadelphia, Pa..... 560
Davis & Farnum Mfg. Co., Waltham, Mass..... 556
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 556
Stacey Mfg. Co., Cincinnati, Ohio..... 559
R. D. Wood & Co., Philadelphia, Pa..... 558

DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO., 813 DREXEL BUILDING, PHILA., Mar. 26, 1896.

The Directors have this day declared a quarterly dividend of 2 per cent. ($1 per share), payable on April 15, 1896, to stockholders of record at the close of business April 1st. Checks will be mailed. EDWARD C. LEE, Treas.

Position Wanted

As Superintendent of Gas Works.

Has been in the employ of the Passaic (N. J.) Gas Company for the last 10 years as Superintendent, and is a practical mechanic, thoroughly understanding the laying out and erection of plants and the making of coal and water gas. Seventeen years' experience as constructor and builder with John Hanlon, Gas Engineer. Best of references. Address
1086-5 FRANK JONES, Passaic, N. J.

Position Wanted

As Superintendent of Gas Works or Gas and Electric Light Works.

Has been in the employ of the Long Branch (N. J.) Lighting Company as Superintendent for the last 11 years, and is a practical mechanic, thoroughly understanding the laying out and erection of plant and the making of coal and water gas. Best of references. Address CHAS. J. LUTHER,
1084-4 Box 142, Long Branch, N. J.

POSITION WANTED

As Supt. or Manager of a Gas Works or Gas and Electric Light Works.

Fifteen years' experience as Manager of Gas Works and six years Gas and Electric Light Works. Good reasons for wishing to change present employment.
1043-tf Address "Y. B.," care this Journal.

WANTED,

Two Cast Iron Purifying Boxes,

6 ft. by 8 ft., 3 ft. deep, 18 inch Seal, 8 inch Connections.
Address J. O. HUDSON,
Supt. Gas Light Co.,
1087-3 Bordentown, N. J.

FOR SALE,

Four Purifying Boxes, 8 ft. by 8 ft.,

with 6-inch Center Valves and Connections, in good order.
HOUSTON GAS LIGHT CO.,
1085-10 Houston, Texas.

FOR SALE,

Two 10-in. Smith & Sayre Exhausters, Four Purifying Boxes, 10 ft. by 16 ft., with 10-inch Connections.

SPRINGFIELD GAS LIGHT CO.,
1084-4t Springfield, Mass.

FRED. H. WILKES,

Accountant and Auditor,

KINGSTON, N. Y. (P.O. Box 1095.)

Gas Companies', Electric Lighting and Street Railway Accounts Audited and Systematized. Special Consumers' Ledgers. Books and forms made up for any requirements. State Reports attended to. 1086-4

DAVID LEAVITT HOUGH,

26 CORTLANDT ST., N.Y. CITY.

Consulting Engineer.

Investigations and Appraisals.
Designs and Estimates.

Contractor.

Machinery and Structures.
Gas and Water Pipe.

Special Agent for Selling & Purchasing.

Patent Lava Gas Tips.

D. M. STEWARD MFG. CO.,
CHATTANOOGA, TENN.

MICA CHIMNEYS

MICA CANOPIES AND CHIMNEYS

For Welsbach Lights.

Send for Catalog and Discounts.

The Mica Mfg. Co.,

MICASMITHS,

No. 88 Fulton St., N. Y. City.

Utilize Your Gas Liquor.

NO EXTRA LABOR OR OPERATING EXPENSES.

Ammonia Concentrator,

Not Expensive. Write to
STROH & OSIUS, Pat'ees, or
Mich. Ammonia Works, Detroit, Mich.

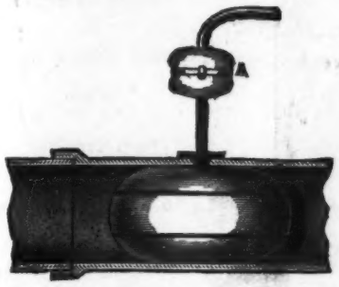
THE GREATEST IMPROVEMENT IN GAS LIGHTING
Has been made by
WILDER'S VOLUMETRIC GOVERNORS.

They control the pressure at the burner, and deliver the quantity for which they are set regardless of high or low pressure in the supply.

WELSBACH LIGHTS are fully controlled, and the governors soon pay for themselves by preventing the breaking of mantles and chimneys. Thousands are already in use. Orders may be given to the Welsbach Co., or sent to ourselves.

THE WILDER MANFG. CO., - 816-822 Cherry St., PHILADELPHIA.

Peerless Patent
Improved Gas Bag



These Gas Bags are used to stop the flow of gas while repairing or making alterations in gas mains. There have been numerous cases of workmen being badly injured, and sometimes fatally, by the escape of gas resulting from the bursting of a bag, and our patent improvement is designed to obviate such calamities. The indicator *A* shows unerringly when the bag has been sufficiently inflated to pack the main, and when the pumping should be stopped. Our Bags are made of a rubber stock especially prepared to admit of great distension, and to resist the action of Oils, Gases, Naphtha and other residuum in the mains, and they are made with lapped joints, which adds greatly to their strength.

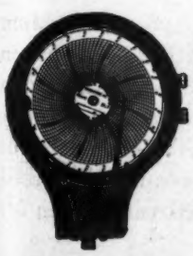
3-in. Gas Bag, each,	$0.60		12-in. Gas Bag, each,		$5.00
4 " " "	.80		16 " " "		8.25
5 " " "	1.05		20 " " "		12.00
6 " " "	1.75		24 " " "		17.00
8 " " "	2.65		30 " " "		27.50
10 " " "	3.75				

The Peerless Rubber Mfg. Co.
16 Warren St., N. Y. City.

J. C. GRANGER, successor to NICHOLLS & GRANGER
Manfr. of
GAS STOVE TUBING.
Guaranteed Best Quality.

PAT. END GAS TUBE.
Patent Portable Tubing.
Speaking Tubing.
Elevator Tubing.
582 to 588 Hudson Street, New York City.

BRISTOL'S RECORDING PRESSURE GAUGE



For Continuous Records of
Street Gas Pressure.
Simple in Construction,
Accurate in Operation,
Low in Price,
Fully Guaranteed.
Send for Circulars.
THE BRISTOL CO.
Waterbury, Conn.

Received Medal at World's Columbian Exposition.

HERMAN POOLE * Chemical Engineer,
323 West 34th Street, N. Y. City,
Makes a Specialty of
PURIFICATION
And the Utilization of Waste Products in Gas Manufacture

G. W. HUNT COMPANY.

THE HUNT TIP CAR.

COKE CARS for Gas Works,
TIP CARS for Carrying Ashes,
CHARGING CARS for Bringing Coal from the Storage Bins to Boiler Room and Retort Houses.
INDUSTRIAL RAILWAYS
Specially designed for handling material in and around
Gas Works, Coal Yards, Factories, Etc., Etc.
45 BROADWAY, - - NEW YORK.

THE ANDERSON Patent Cutter Carrying Link
Made in all sizes.

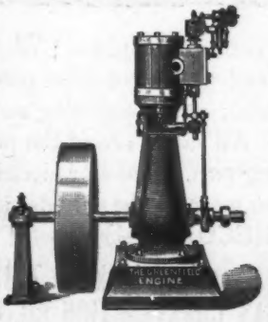
Will cut from 2 in. to 24 in.
Pipe Cutting Tool

For Cutting Cast, Wrought Iron, Gas & Water Pipes.
WM. ANDERSON,
425 Meridian Street,
East Boston, Mass., or
WALDO BROS.,
88 Water Street, Boston, Mass.

The Pioneer Vertical Water-Tube Boiler of the World!

THE HAZELTON OR PORCUPINE BOILER.

After Sixteen Years of Active Service in all the Principal Industries, this Boiler has Proven Itself Superior to all Others in Economy of Fuel, Durability, Safety and General Efficiency.
NO EXPLOSIONS OR ACCIDENTS OF ANY KIND.
Correspondence Solicited.
The HAZELTON BOILER COMPANY,
Sole Proprietors and Manufacturers,
Cable Address, "Paila," New York. Tele., "1229-18th St.," New York. Gen'l Office, 716 E. 13th St., N.Y., U.S.A.



GREENFIELD
Steam Engine Works.
Established 1874.
MANUFACTURERS OF
Greenfield Stationary, Portable and Yacht
ENGINES AND BOILERS.
Also Horizontal, Automatic and Variable Cut-off Engines.
Sizes from 3 to 75 Horse Power.
Also Vertical and Horizontal and Marine Boilers.
Steam Pumps and Adams' Grate Bars.
W. G. & G. GREENFIELD, - - EAST NEWARK, N. J.

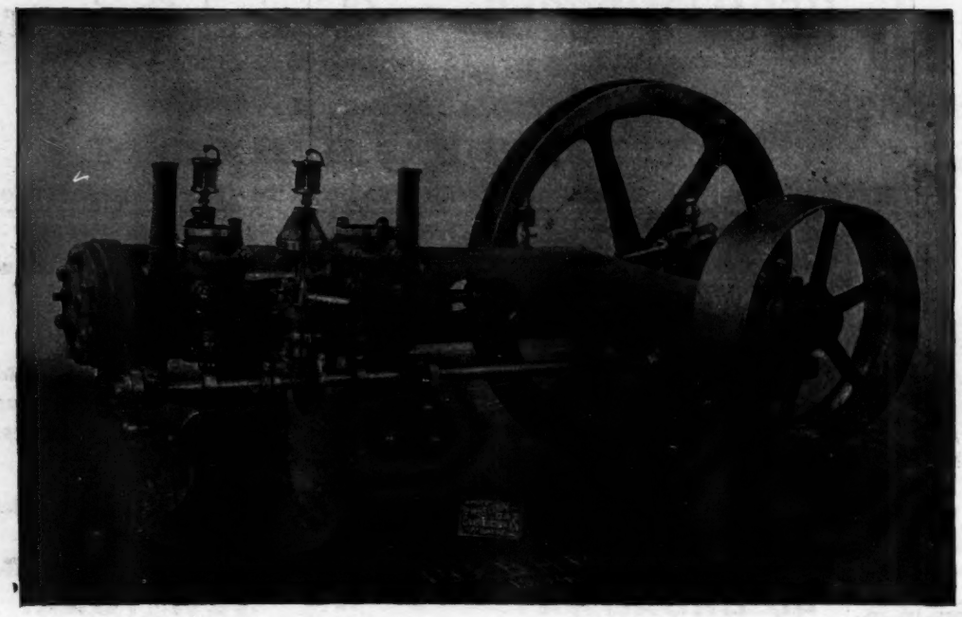
WM. W. GOODWIN, Prest. O. N. CULDLIN, V.-Prest. & Treas. H. B. GOODWIN, Sec. ERNEST F. LLOYD, Asst. Sec

THE AMERICAN GAS ENGINE CO.,

MANUFACTURERS OF

The Double-Acting Gas Engine,

Under the Patents of Griffin, and Dick, Kerr & Co., of London and Kilmarnock.



**

Single Cylinder.

Impulse Every Revolution.

(Two Strokes.)

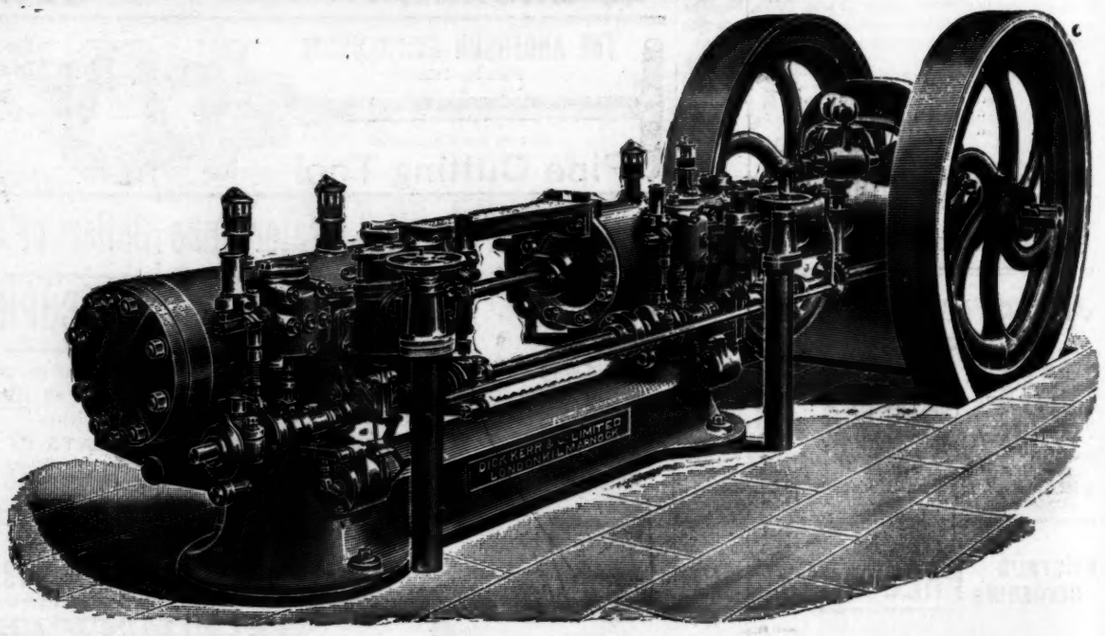
15 to 500 Horse Power.

For General Work and Isolated Electric Plants.

**

Tandem Cylinder. Impulse Every Stroke. 100 to 1,000 Horse Power.

For Central Stations and all work requiring extreme steadiness.



ESSENTIAL PRINCIPLE.—An impulse at each end of piston; using half force to each impulse; doubling the steadiness; reducing the wear on moving parts, and weight for given power. **CONSTRUCTION.**—The piston rod works through stuffing box in front end of cylinder, and connecting rod is carried in a cross-head working in a slide in frame, as in ordinary steam engine practice. All valves are of the poppet type, operated by cams on a single cam-shaft, giving positive movement to every working part. Tube or electric ignition. **RESULT.**—An engine of extreme simplicity and steadiness of action, the even wear on the cylinder and all working parts assuring increased economy, long life, and minimum cost in repairs. **RECORD.**—Successful and constant use in Great Britain for the past eight years. Address

W. W. GOODWIN, President, Lock Box 718, Philadelphia, Pa., or
THE WESTERN GAS CONSTRUCTION CO. Bldrs. & Gen. Agts. Fort Wayne Ind.

The Improved

Welsbach Light.

No. 34 Burner, with Nos. 10 and 43 Shades.

No. 34 Burner, with No. 74 Shade.

Welsbach Commercial Company,

Drexel Building,

PHILADELPHIA, PA.

AMERICAN GAS COMPANY,

222 South Third Street, Philadelphia, Pa.

Owns, Operates, Buys and Leases Gas Works.

ALSO UNDERTAKES ALL KINDS OF CONSTRUCTION WORK.

Especially the Installation or Extension of Plants for the Manufacture of Gas from Caking Coal.

The attention of Gas Managers is particularly called to the many improvements in this method of manufacture instituted during the past fifteen years, and the extremely low cost at present of Coal Gas.

CORRESPONDENCE RESPECTFULLY SOLICITED. Address

GEO. G. RAMSDELL, Gen'l Mangr.

Send for New Catalogue, Just Issued.

Everything in the
Line of Gas Appliances
for
Heating, Cooking
and
Manufacturing Purposes.

THE NEW VULCAN FAMILY RANGE.

Write for Quotations
on Brass Fittings of all
kinds. We carry
Meter and Service Cocks,
Independent & Hose Cocks,
Gas Tubing, etc.

WILLIAM M. CRANE & CO.,

Factory, 447-453 W. 14th St.

Office, 838 Broadway, N. Y. City.

Fire King Gas Stoves and Ranges.

BEST IN THE WORLD.

The accompanying cut shows our New Table Gas Range, which is listed at only **$12.00.** This is the Gas Stove to sell to the majority of people, who hesitate about paying out very much money for a large Gas Range.

We have gotten out more new patterns than any other manufacturer of Gas Stoves in the World. . . . . .

FIRE KING
GAS STOVES & RANGES
TRADE MARK
BEST IN THE WORLD.

Send for New Catalogue, Just Out.

A. WEISKITTEL & SON,

BALTIMORE, MD.

JEWEL GAS STOVES

A few of the world's best Gas Stoves. All prominent demonstrators of cooking use them. Nine-tenths of the Chicago apartment houses are furnished with the same . . . . . .

One Name
Covers All.

52 Styles of Cookers.
54 Styles of Heaters.

A JEWEL CATALOG
IS WORTH THE ASKING.

GEORGE M. CLARK & COMPANY, Makers, CHICAGO.

Eastern Agency, 152-154 West 23d Street, N. Y. City.

THE LITTLE GIANT (SUTHERLAND'S IMPROVED LOWE) GENERATOR.

The Most Economical, Efficient and Reliable

WATER GAS APPARATUS

In the World for Small to Medium Works.

Can be put into Coal Gas Works at a price the interest on which will not be so much as their present repair account.

This Generator is now in use in nearly every State in the Union, and everyone using it will recommend it to you.

It makes a faultless gas from whatever gas-producing materials are cheapest in the locality where required, using hard coal or coke in connection with Lima crude or any other crude petroleum or its distillates, including *Naphtha of any specific gravity.*

I build these Generators with any required capacity, from 3,000 cubic feet per hour upward.

In more than one half the gas works in the country the "Little Giant" will enable *one man* to easily make, in *five hours*, all the gas needed for the *twenty-four hours.*

If gas coal is very cheap and anthracite coal and hard coke very expensive with you, put in a Little Giant Generator, as many others have done, *to use up your surplus coke, and to rush up your holder when hard pressed.*

All work and results guaranteed.

Contracts Taken for Entire Works and Special Attention Given to Holders.

A. M. SUTHERLAND, - - - - No. 231 Broadway, N. Y. City.

CHAS. M. JARVIS, Prest. & Chief Engineer. BURR K. FIELD, Vice-President. GEO. H. SAGE, Secretary. FRANK L. WILCOX, Treasurer.

THE BERLIN IRON BRIDGE CO.

Engineers, Architects, and Builders of Iron and Steel Structures.

The above illustration, taken direct from a photograph, shows the construction of a Parabolic Truss Bridge built by us at Montgomery, Orange County, N. Y. The bridge consists of two spans of 115 feet each, with a roadway 20 feet wide in the clear, and one sidewalk 16 feet wide.

Write for Illustrated Catalogue.

Office and Works, No. 6 Railroad Avenue, East Berlin, Conn.

ALEX. C. HUMPHREYS, M.E., MANHATTAN LIFE BUILDING, (64 BROADWAY,) NEW YORK.

CABLE ADDRESS, LONDON & NEW YORK, "HUMGLAS."

ARTHUR G. GLASGOW, M.E., 9 VICTORIA ST., LONDON, S. W., ENGLAND.

HUMPHREYS & GLASGOW,

CONTRACTING AND CONSULTING

GAS ENGINEERS.

WATER GAS PLANT A SPECIALTY.
GAS PROPERTIES EXAMINED AND VALUED.
ADVICE AS TO IMPROVEMENT OF GAS PROPERTIES AND MANAGEMENT.

THE MANAGEMENT OF SMALL GAS WORKS.

By C. J. R. HUMPHREYS.

Price $1.

A. M. CALLENDER & CO., No. 32 Pine Street New York.

(Copyrighted, 1894, by the AMERICAN METER CO.

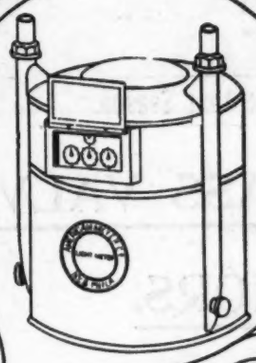
AMERICAN METER CO.

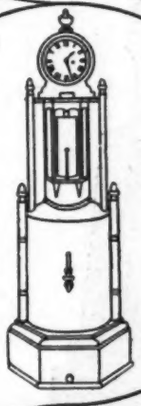
ESTABLISHED 1834. INCORPORATED 1863.

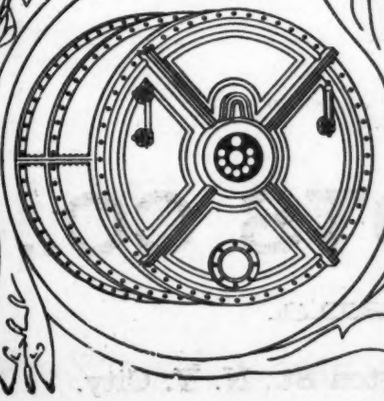
NEW YORK AND PHILADELPHIA,

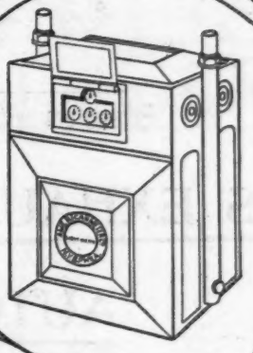
CHICAGO, ST. LOUIS,

SAN FRANCISCO.









PUBLIC LIGHTING TABLE.

APRIL, 1896.

Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING Light.	Extinguish.
				P.M.	A.M.
Wed.	1	6.50 PM	12.10 AM	6.10	4.55
Thu.	2	6.50	1.20	6.15	4.40
Fri.	3	6.50	2.20	6.15	4.40
Sat.	4	6.50 LQ	3.00	6.15	4.40
Sun.	5	7.00	3.40	6.15	4.40
Mon.	6	7.00	4.10	6.15	4.40
Tue.	7	7.00	4.30	6.15	4.40
Wed	8	7.00	4.30	6.15	4.40
Thu.	9	7.00	4.30	6.25	4.30
Fri.	10	7.00	4.30	6.25	4.30
Sat.	11	7.00	4.30	6.25	4.30
Sun.	12	7.10 NM	4.20	6.25	4.30
Mon.	13	7.10	4.20	6.25	4.30
Tue.	14	7.10	4.20	6.25	4.30
Wed	15	7.10	4.20	6.25	4.30
Thu.	16	7.10	4.20	6.30	4.20
Fri.	17	10.40	4.20	6.30	4.20
Sat.	18	11.30	4.20	6.30	4.20
Sun.	19	12.10 AM	4.10	6.30	4.20
Mon.	20	12.50 FQ	4.10	6.30	4.20
Tue.	21	1.20	4.10	6.30	4.20
Wed.	22	1.50	4.10	6.30	4.20
Thu.	23	2.20	4.10	6.40	4.10
Fri.	24	2.50	4.10	6.40	4.10
Sat.	25	3.10	4.10	6.40	4.10
Sun.	26	No L.	No L.	6.40	4.10
Mon.	27	No L. FM	No L.	6.40	4.10
Tue.	28	No L.	No L.	6.40	4.10
Wed.	29	7.20 PM	11.00 PM	6.40	4.10
Thu.	30	7.20	12.00	6.45	4.00

TOTAL HOURS LIGHTING DURING 1896.

By Table No. 1.	Hrs.Min	By Table No. 2.	Hrs.Min.
January	220.40	January	423.20
February	207.00	February	367.40
March	193.00	March	355.35
April	174.10	April	298.50
May	164.00	May	264.50
June	142.10	June	234.25
July	142 10	July	243.45
August	150.50	August	280.25
September	163.00	September	321.15
October	193.10	October	374 30
November	207.00	November	401.40
December	237.30	December	433.45
Total, yr.	2194.40	Total, yr.	4000.00

P. H. & F. M. ROOTS CO.,

Connersville, Ind.

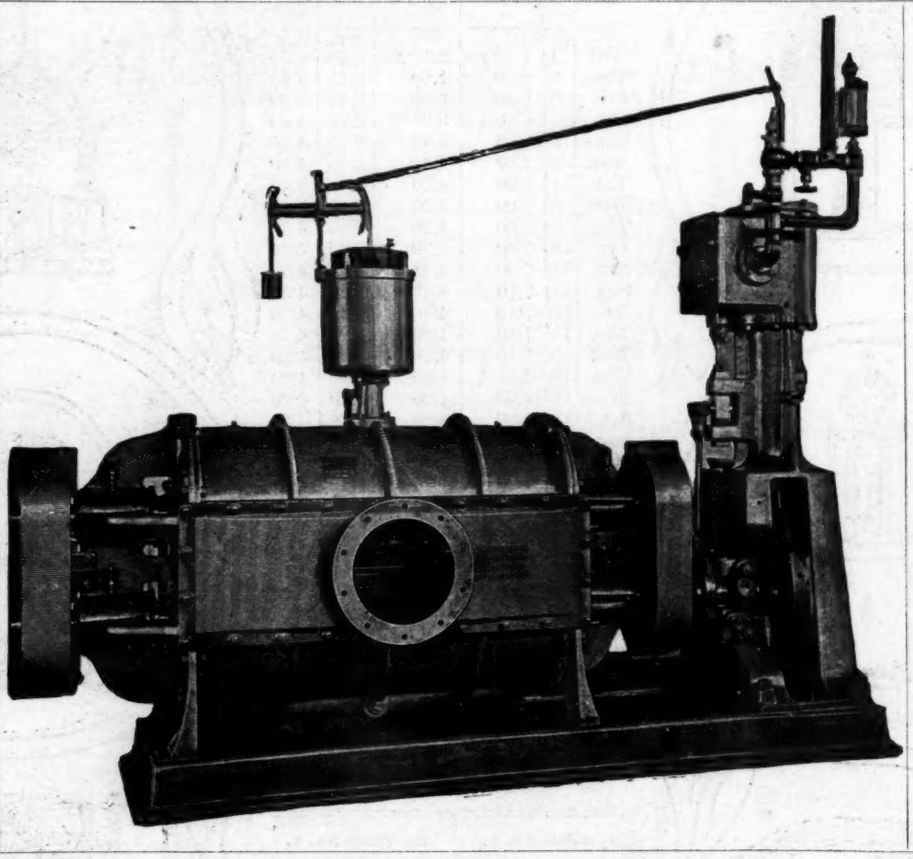
Exhausters with Combined Capacity of 75,000,000 Feet per Day Sold Last Season.

GAS EXHAUSTERS. BYE-PASS VALVES.

AUTOMATIC GAS GOVERNORS.

GAS VALVES. PIPE FITTINGS.

New Design of Direct Connected Engine and Exhauster on Same Bedplate.



This Design is Used for all Exhausters from No. 7 to No. 10, Inclusive.

Write for Illustrated Catalogue.
Estimates submitted on application.

P. H. & F. M. ROOTS CO.,

Connersville, Indiana.

COOKE & CO., Selling Agts., 163-165 Washington St., N. Y. City.

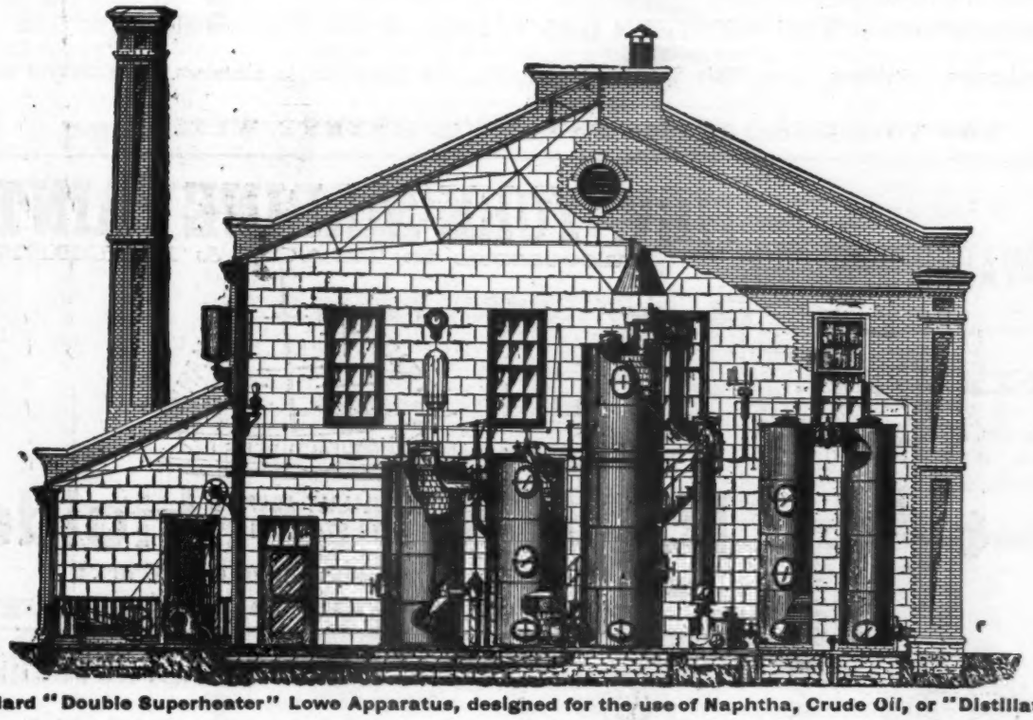
THE UNITED GAS IMPROVEMENT CO.,

DREXEL BUILDING, PHILA., PA.

Inquiries from any part of the United States should be addressed to the Philadelphia Office.

BUILDERS OF

THE STANDARD LOWE WATER GAS APPARATUS.



Standard "Double Superheater" Lowe Apparatus, designed for the use of Naphtha, Crude Oil, or "Distillates."

BUILDERS, LESSEES AND PURCHASERS OF GAS WORKS.

Water Gas Plants, either independent or auxiliary to Coal Gas Works, erected to meet any conditions. Apparatus designed to use any grade of Oil, and Anthracite Coal, or Gas House or Oven Coke.

PAMPHLETS, PLANS AND ESTIMATES FURNISHED UPON APPLICATION.

THE WESTERN GAS CONSTRUCTION CO.,

ENGINEERS and BUILDERS,

FORT WAYNE, INDIANA.

Water Gas Apparatus . . .

Improved Double Superheater Settings,
Improved Single Superheater Settings,
Special Designs for Small Works.

Our apparatus is designed to use any grades of Oils or Naphthas, Gas House or Oven Coke, or Anthracite Coal. Results are Guaranteed.

Coal Gas Apparatus . . .

Agents and Builders { For FRED. BREDEL—Washers and Purifying System, Mouthpieces and Bench Castings.
For GEO. SHEPARD PAGE'S SONS—Walker Ammonia Concentrators and Sulphate Stills, Walker Patent Mouthpieces.

Manufacturers of THE WESTERN GAS VALVE, all Iron, Double Gate, 4 to 36 Inch.

Purifiers, Condensers, Scrubbers, Street Main Specials, Iron Roofs, Iron Floors, Oxide Elevators and Conveyer Machinery.

New York Office, 32 Pine Street, WM. HENRY WHITE, Engr.

THE

LUDLOW VALVE MFG. CO.,

MANUFACTURERS OF

VALVES,

Double and Single Gate, ¾ in. to 72 in., outside and inside Screws. Indicator, etc., for Gas, Water, Steam, Oil and Ammonia.

SEND FOR CIRCULAR.

SEND FOR CIRCULAR.

ALSO,

Hydraulic Main Dip Regulators, Check Valves, Foot Valves, Yard Wash and Fire Hydrants.

OFFICE AND WORKS:
938 to 954 River St. & 67 to 83 Vail Av.
TROY N Y.

NEW YORK MARINE PAINT CO.

Successors to TRACY & HADDEN.

PAINT PECULIARLY ADAPTED TO STAND ON Holders

And all Ironwork about Gas Works.

POUGHKEEPSIE, N. Y.

CHAPMAN VALVE MANUFACTURING CO.,

MANUFACTURERS OF

Valves and Gates for Gas, Ammonia, Water, Etc.

Also, Gate Fire Hydrants with and without Independen Nozzle Valve. All Work Guaranteed.

Works & Gen'l Office, Indian Orchard, Mass. Treasurer's Office, 72 Kilby & 112 Milk Sts., Boston Mass
Chicago Office, 24 West Lake St. New York Office, 28 Platt St.
St. Louis Office, L. M. Rumsey Mfg. Co., 810 North Second St

GASHOLDER TANKS AND GAS WORKS MASONRY COMPLETE

Plans prepared and Estimates furnished at short notice.

J. P. WHITTIER,

70 Rush St., Near Division Ave., Brooklyn, N. Y.

The Gas Engineer's Laboratory Handbook.

By JOHN HORNBY, F.I.C.

Price, $2.50.

A. M. CALLENDER & CO., 32 Pine Street N. Y. City

NATIONAL GAS AND WATER CO.,

218 La Salle Street, Chicago.

Builder and Operator of Gas Works.

The Rew Soft Coal Carbureted Water Gas Apparatus.

TESTED BY TWO YEARS' PRACTICAL OPERATION, AND FULLY GUARANTEED.

Plans and Estimates Upon Application.

IRWIN REW, President & Treasurer. N. A. McCLARY, Secretary & Gen'l Manager. E. E. MORRELL, Engineer.

CONNELLY IRON SPONGE AND GOVERNOR CO.,

(Successors to CONNELLY & CO.)

MANUFACTURERS OF GAS WORKS SPECIALTIES.

"IRON SPONGE." Saves money, saves labor, and is the most efficient purifying material ever offered as a substitute for lime. We guarantee a large saving, both in cost of material and labor.

AUTOMATIC GOVERNOR. OVER FOUR HUNDRED NOW IN USE! NO WORKS COMPLETE WITHOUT IT! WILL PAY FOR ITSELF WITHIN A YEAR! ITS SERVICE SECURES PERFECT DISTRIBUTION. REDUCES LEAKAGE TO MINIMUM, and BENEFITS THE COMPANY and CONSUMER ALIKE! IT IS THE ONLY RECOGNIZED AUTOMATIC GOVERNOR IN THE WORLD!

STEAM JET EXHAUSTER. Designed particularly for small works. Combines Exhaust Tube, Steam Governor, Gas Compensator and Bye-Pass Valves in the most compact form possible. Occupies but little space; uses very little steam; saves formation of carbon in retorts; increases yield 10 to 15 per cent. No works too small to use them profitably.

Prices given on all our specialties, delivered at any point in the United States. Correspondence solicited.

CONNELLY IRON SPONGE AND GOVERNOR CO., No. 365 Canal St., New York.

Practical Photometry.

A GUIDE TO THE STUDY OF THE MEASUREMENT OF LIGHT.

By William Joseph Dibdin.

Price, $3.00.

A. M. CALLENDER & CO.,

32 Pine Street, N. Y. City.

BOOKS.

DISTILLATION OF COAL TAR AN AMMONIACAL LIQUOR.

By GEORGE LUNGE. Price $12.50.

TREATISE ON THE COMPARATIVE COMMERCIAL VALUES OF GAS COALS AND CANNELS.

By DAVID A. GRAHAM. 8vo., Cloth. Price $3.

Orders for these books may be sent to this office.

A. M. CALLENDER & CO., 32 PINE ST., N. Y. CITY

DOUGLAS' FERRIC OXIDE

For Gas Purification

Is a superior natural Hydrated Oxide of Iron. Will give a higher purification per bushel than any other material. We ship the pure Oxide of Iron, containing no sawdust, thus effecting a saving in freight, leaving the consumer to furnish the diluent at a nominal cost. It is now used by the largest gas companies in the West.

Full information, with references to many users, and prices delivered in any locality, furnished on application to

H.W. Douglas (Supt. Ann Arbor Gas Company) **Ann Arbor, Mich.**

IRON MASS

For Gas Purification.

Acts immediately, and more efficiently than any other purifying agent now in use.

Greenpoint Chemical Works.

JOHN SCHRIEVER, Manager.

Greenpoint Ave. & Newtown Creek, Brooklyn N.Y.

The American Gas Engineer and Superintendent's Handbook.

By WM. MOONEY.

350 Pages, Full Gilt Morocco. Price. $8.00.

A. M. CALLENDER & CO., 32 Pine St., N. Y.

JAMES D. PERKINS. **PERKINS & CO.,** F. SEAVERNS.

228 and 229 Produce Exchange, New York City.

TIDEWATER SALES AGENTS FOR THE FOLLOWING

Standard Gas Coals and Cannel.

Ocean Mine Youghiogheny Gas Coal,

From Baltimore.

Clinch Valley, Thacker & Logan Gas Coals

From Norfolk, Va.

Old Kentucky Shale and O. K. Boghead,

From Kentucky,

The Most Valuable Enricher Now Obtainable.

Second Only to the Celebrated Australian Shale.

Cargo Shipments from New York, Philadelphia, Baltimore and Norfolk.

Single carloads or more delivered at any required point in the United States or Canada.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

Offices:

55 Broadway, New York.

Betz Building, Philadelphia.

STRICTLY High Grade. . . . .
Carefully prepared.
For Gas Making or
Heavy Steaming.

Coal Tar Genealogical Tree

MR. T. VINER CLARKE, of London, Eng., having compiled a novel Chart or Map illustrating the various

CHEMICAL PRODUCTS DERIVED FROM COAL AND COAL TAR,

In the form of a Genealogical Tree, including all the products discovered to date (the total number amounting to near 700), offers for sale a limited number of copies in Colors, mounted on Linen, with Rollers. Price, $3.50. Orders may be sent to

A. M. CALLENDER & CO., - - No. 32 Pine Street, New York.

GAS ENRICHERS. GAS COALS. GAS COALS.

The Despard Gas Coal Co.,

MINERS AND SHIPPERS OF

DESPARD GAS COAL,

AND MANUFACTURERS OF

COKE.

MINES, - - Clarksburgh, Harrison Co., West Va.
WHARVES, - - - Locust Point, Baltimore, Md.
OFFICE, - - - 44 South Street, Baltimore, Md.

ROUSSEL & HICKS, 71 Broadway, N. Y. } AGENTS, { BANGS & HORTON 60 Congress St., Boston.

HENRY C. SCHEEL,

Tidewater Sales Agent and Shipper of High Grade Westmoreland Vein, Youghiogheny, and West Virginia
Thoroughly Screened

GAS COALS.

Superior Kentucky Gas Cannel, Connellsville and Mountain Coke, Clearfield and Cumberland Vein Steam and Smithing Coals.

Room 176, Washington Building, No. 1 Broadway, N. Y. City.

WILBUR H. TOWNSEND,

BROKER AND DEALER IN

Naphthas, Gas and Fuel Oils and Crude Petroleum for Gas Companies.

Room 164, 29 Broadway, N.Y. City.

KELLER ADJUSTABLE COKE CRUSHER.

Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER,
Sec. & Supt. Gas Lt. & Coke Co.,
Columbus, Ind.
Correspondence Solicited.

GREENOUGH'S "DIGEST OF GAS CASES."

Price, $5.00.

This is a valuable and important work, a copy of which should be in the possession of every gas company in the country, whether large or small As a book of reference it will be found invaluable. It is the only work of the kind which has ever been published in this country, and is most complete. Handsomely bound. Orders may be sent to

A. M. CALLENDER & CO., 32 Pine St., N. Y.

— THE —

PENN GAS COAL CO.

OFFER THEIR

Coal, Carefully Screened and Prepared for Gas Purposes.

Their property is located in the Youghiogheny Coal Basin, near Irwin and Penn Stations on the Pennsylvania Railroad, and on the Youghiogheny River.

Principal Office:

Room 720, Reading Terminal Building, Phila., Pa.

Points of Shipment:

Pennsylvania Railroad Piers; Greenwich Wharves, Delaware River; Pier No. 1 (Lower Side), South Amboy, N. J.

EDMUND H. McCULLOUGH, Prest. CHAS. F. GODSHALL, Treas. H. C. ADAMS, Sec.

THE WESTMORELAND COAL CO.

Chartered 1854.

Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.

POINTS OF SHIPMENT:

PHILADELPHIA, BALTIMORE, SOUTH AMBOY, N. J., WATKINS (SENECA LAKE), N. Y.

Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas-giving qualities, and in freedom from sulphur and other impurities.

Principal Office, 224 South 3d St., Phila., Pa.

THE SUN OIL CO.,

OHIO CRUDE OIL,

38 to 41 Degrees Gravity.

Toledo, O., and Pittsburgh, Pa.

Standard Oil Company,

GAS NAPTHA DEPARTMENT.

GAS NAPTHA.

GAS OIL.

Correspondence Solicited.

26 Broadway, New York City

RETORTS AND FIRE BRICK. RETORTS AND FIRE BRICK. RETORTS AND FIRE BRICK.

CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J.H. GAUTIER & COMPANY

CORNER OF

GREENE AND ESSEX STREETS,

JERSEY CITY, N. J.

MANUFACTURERS OF

Clay Gas Retorts,

Gas House Tiles,

Fire Bricks, Etc. Etc.

Ground Clay, Fire Brick and Fire Sand in Barrels.

Brooklyn Fire Brick Works,

MANUFACTURERS OF

CLAY RETORTS, FIRE BRICK,

Gas House and other Tile.

Office, 88 Van Dyke St., Brooklyn, N. Y.

LACLEDE FIRE BRICK MFG. CO.,

MANUFACTURERS OF

Fire Brick, Gas Retorts,

AND

ST. LOUIS STANDARD SEWER PIPE.

Blast Furnace and Cupola Linings, every description of Fire Clay Material, Fire Clay Flue Linings, Chimney Tops Dry Milled and Crude Fire Clays, etc.

OFFICE AND DEPOT

901, 903, and 905 Pine Street

ST. LOUIS, MO.

ESTABLISHED IN 1845.

B. KREISCHER & SONS,

OFFICE FOOT OF HOUSTON ST., E.R., N.Y.

Gas Retorts,

TILES, FIRE BRICK.

AND EVERYTHING IN THE FIRE CLAY LINE.

ADAM WEBER,

Proprietor,

Manhattan Fire Brick and Enameled Clay Retort Works

Works, Weber, N. J.
Office, 633 East 15th St., New York.

Modern Recuperative Furnaces

AND

Standard Fire Brick and Gas Retorts.

Works,
LOCKPORT STATION, PA.

—ESTABLISHED 1864.—

JAMES GARDNER, JR.,

Successor to WILLIAM GARDNER & SON.

Conestoga Bldg., Wood & Water Sts.
PITTSBURGH, PA. P. O. Box 373.

Fire Clay Goods for Gas Works.

SOLE REPRESENTATIVE OF THE McILHENNY REGENERATIVE BENCHES FOR THE U. S.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.
OFFICE, 418 to 422 East 23d St., N. Y

Clay Gas Retorts,

BENCH SETTINGS,

Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT.

A cement of great value for patching retorts, putting on mouth-pieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

PRICE LIST.

In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD & CO.,

N. 3d & Prospect Avs., Mt. Vernon, N.Y.

Western Agent, H. T. GEROULD, Centralia, Ills.

Parker-Russell Mining and Mfg. Co.,

CITY OFFICE,

417 Pine Street, St. Louis, Mo.

PROPRIETORS OF THE

OAKHILL GAS RETORT & FIRE BRICK W'KS

Our immense establishment is now employed almost entirely in the manufacture of

Materials for Gas Companies

We have studied and perfected three important points. Our retorts are made to stand changes of temperature, the strongest heats of the furnace, and the abrasion of feeding and emptying. We construct

Half and Full Depth Benches of Our Own Design,

Containing 6, 8 or 9 Retorts.

We have Greatly Improved our Recuperators. Coal or Coke can be used as Fuel in Furnaces.

THEO. J. SMITH, Prest. J. A. TAYLOR, Sec'y.
A. LAMBLA, Vice-Prest. and Supt.

BALTIMORE

RETORT & FIRE BRICK CO.

MANUFACTORY AT

LOCUST POINT BALTIMORE MD.

Clay Retorts, Blocks & Tiles

FIRE BRICK, FIRE CLAY,

AND FIRE CEMENT.

Red and Buff Ornamental Tiles and Chimney Tops. Baker Oven Tiles 12 x 12 x 2 and 16 x 16 x 2.

WALDO BROS., 88 WATER ST., BOSTON, MASS

Sole Agents for New England States.

PRACTICAL PHOTOMETRY.

A Guide to the Study of the Measurement of Light.

By WILLIAM JOSEPH DIBDIN.

With Numerous Illustrations. Price, $3.00. A. M. CALLENDER & CO., 32 Pine Street, N. Y. City.

FRED. BREDEL, C.E.

Coal and Water Gas Plants,

OWN SYSTEM.

Recuperative Furnaces, Washers, Condensers, Purifiers, Purifying Machines.

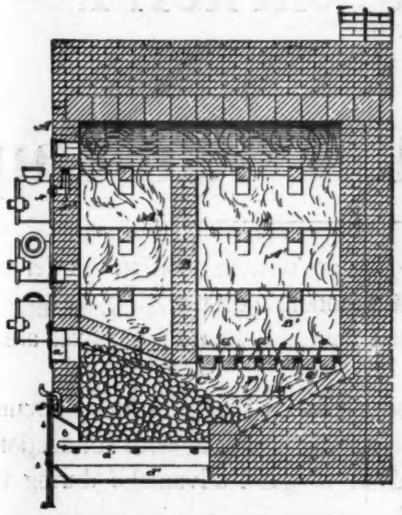
Gas Enriching Plants to Enrich Coal Gas up to 24 Candle Power, and Making a White, Bright, Non-smoking Gas.

COMPLETE GAS WORKS, COKE CONVEYERS, ETC.

No. 118 Farwell Avenue, · · Milwaukee, Wis.

FLEMMING'S

Generator-Gas Furnace



Materials furnished and Benches erected by

J. H. GAUTIER & CO., - Jersey City, N. J

Address as above, or D. D. FLEMMING, Jersey City, N. J.

AMERICAN GAS LIGHT JOURNAL.

$3.00 per Annum.

A. M. CALLENDER & CO.

39 Pine Street, N. Y

A CONVENIENT

BINDER for the JOURNAL

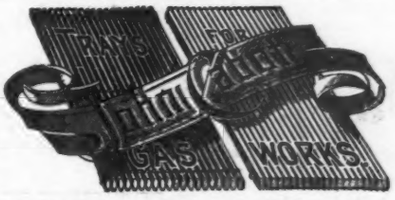
STRONG.
DURABLE.
LIGHT.
SIMPLE
CHEAP.
HANDSOME.
Price, $1.

A.M. Callende & Co.,
39 Pine st.,
N. Y. City

Special Trays for Iron Sponge or Oxide of Iron.

CHURCH'S TRAYS a Specialty.

Reversible, Strongest, Most Durable, Most Easily Repaired



306-310 Eleventh Avenue, New York.

We also make the Cheapest and Strongest REVERSIBLE BOLTED TRAYS IN THE MARKET.

Send for Circulars.

Parson's Steam Blower,

FOR IMPROVING BAD DRAUGHT IN BOILERS, AND FOR BURNING BREEZE OR OTHER WASTE MATERIAL.

PARSON'S TAR BURNER.

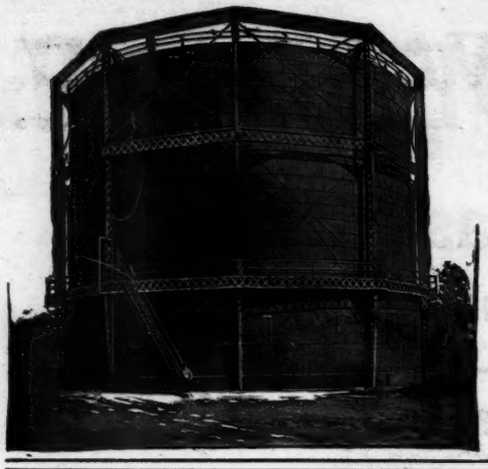
FOR UTILIZING COAL TAR AS FUEL.

PARSON'S AIR JET TUBE CLEANER,

FOR CLEANING BOILER TUBES.

These devices are all first-class. They will be sent to any responsible party *for trial.* No sale unless satisfactory. Manufactured by the WATERTOWN STEAM BLOWER COMPANY.

H. E. PARSON, Supt., 621 Broadway, N. Y.



DAVIS & FARNUM MFG. CO.,

WALTHAM, MASS.

Principal Office & Works, Waltham, Mass. Boston Office, R'm 18, Vulcan Bldg., 8 Oliver St.

Single, Double and Triple-Lift Gasholders of any Capacity. Tubular, Pipe and Sinuous Friction Condensers of all Sizes.

Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

Self-Sealing and Pressed Steel Mouthpiece Lids.

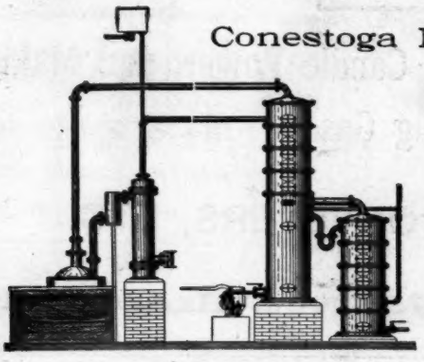
Coke Borrows, Coal Wagons, and all Apparatus Requisite for a Complete Gas Works.

Also, Gas and Water Pipe, Flanged Pipe, Sugar House Work, and Special Castings of all Descriptions.

GAS ENGINEERING COMPANY,

INCORPORATED,

Conestoga Building, PITTSBURGH, PA.



AMMONIA MACHINE.

MANUFACTURERS OF

Gas Works Machinery of all kinds,

PATENTEE AND OWNER OF

PITTSBURGH WASHER-SCRUBBER,

SOLE AGENT FOR

FELDMANN AMMONIA MACHINE,

For producing Sulphate, Aqua, Chloride and Concentrated Liquors.

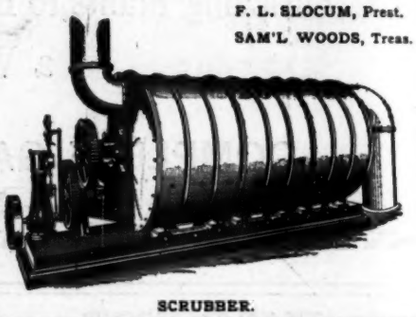
The Erection of Bi-Product Coke Ovens a Specialty.

Faux System of Recuperative Benches,

JAS. GARDNER, JR.
SOLE CONSTRUCTOR AND BUILDER.

NEW SYSTEM HYDRAULIC MAIN.

F. L. SLOCUM, Prest.
SAM'L WOODS, Treas.



SCRUBBER.

INCREASE YOUR PURIFYING CAPACITY

BY THE USE OF THE

"Crighton" Four-Box Center Seal Cap.

Having recently perfected and patented a Five-way Center Seal Cap, we are now in position to offer and recommend it to Gas Companies for increasing their purifying capacity at a moderate cost.

With this Cap you can have **all your Purifying Boxes in constant use,** and where four boxes are in operation at one time, **the capacity is increased one-third.**

Your present Center Seal can be used, and will **only require a new Cap.** Under ordinary circumstances **the change can be made in one day,** and will not necessitate the disturbing of your connections.

Now is the time to make the change, as the work can be done to good advantage during the season of your lightest output.

For information and prices address

KERR MURRAY MFG. CO.,

Manufacturers of Gas Works Apparatus and Holders,

FORT WAYNE, IND.

BARTLETT, HAYWARD & CO.

BALTIMORE, MD.

Triple, Double & Single-Lift

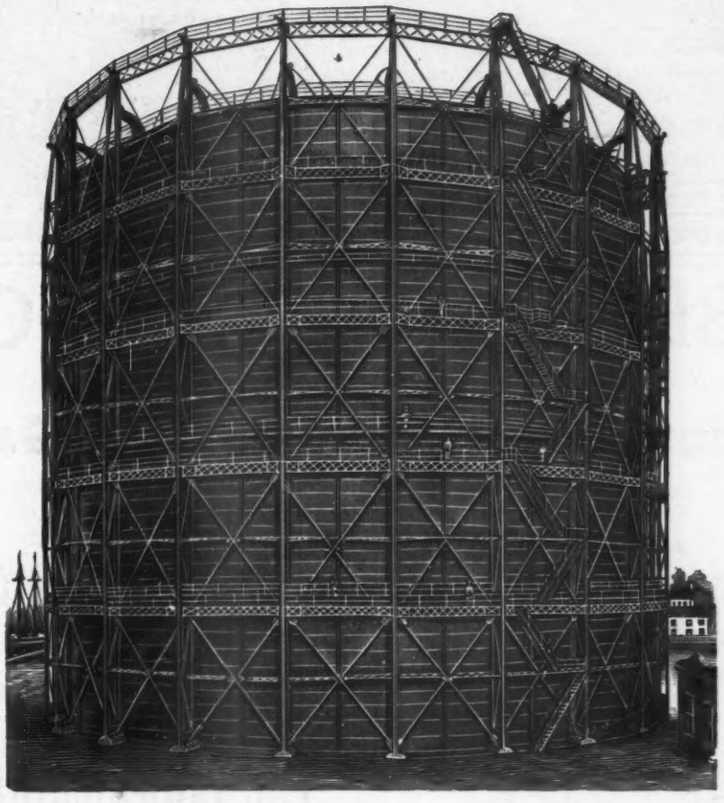
GASHOLDERS.

Iron Holder Tanks.

ROOF FRAMES.

Girders.

BEAMS



PURIFIERS.

CONDENSERS.

Scrubbers.

Bench Castings.

OIL STORAGE TANKS.

Boilers.

Three Four-Lift Gasholders, each of 4,289,500 Cubic Feet Capacity, Erected in Chicago.

The Wilkinson Water Gas Process.

THIRTY-CANDLE, NON-CONDENSABLE, FIXED GAS. THE MOST SUCCESSFUL GAS PROCESS IN OPERATION.

MILL'S REVERSIBLE LIME TRAYS.

Gas Works Designed and Constructed.

W. H. PEARSON, President. J. T. WESTCOTT, Gen'l Mang'r & Treas. L. L. MERRIFIELD, Chief Engineer.

The Economical Gas Apparatus Construction Co., Ld.

269 Front Street, East, - - Toronto, Canada.

ENGINEERS AND BUILDERS

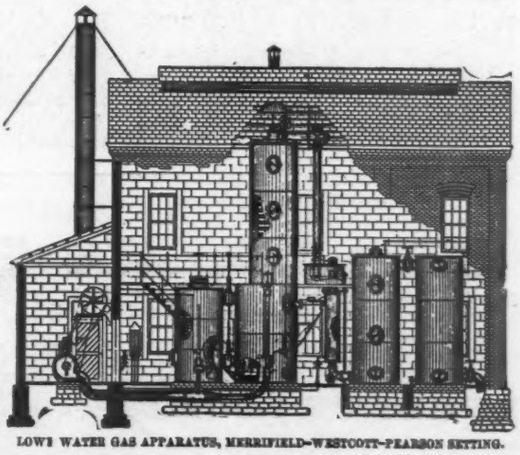
OF THE

Improved Lowe Water Gas Apparatus

Designed to give the Greatest Efficiency when using any kind of Oil, Anthracite Coal, Gas House or Oven Coke.

New Gas Works Built, Present Gas Plants, either Coal or Water, Remodeled

Catalogues, Plans and Estimates Furnished upon Application.



LOWE WATER GAS APPARATUS, MERRIFIELD-WESTCOTT-PEARSON SETTING.

R. D. WOOD & CO., ENGINEERS, IRON FOUNDERS, MACHINISTS.

400 Chestnut Street, Philadelphia, Pa.

MANUFACTURERS OF

CAST IRON PIPE.

BUILDERS OF

Gas Holders,

Single, Double and Triple Lifts, with or without Wrought Iron or Steel Tanks.

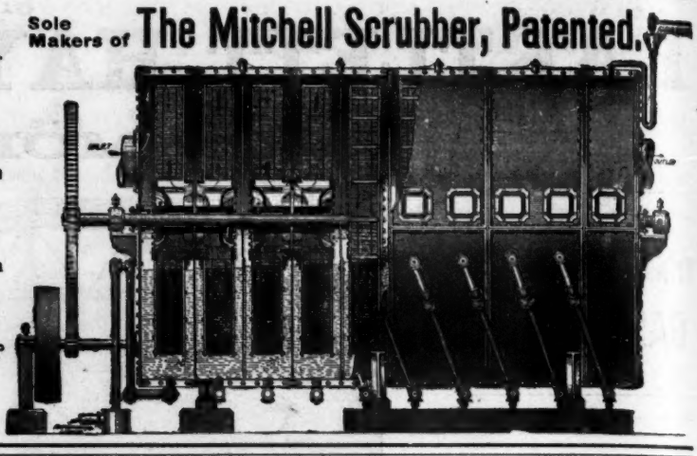
PURIFIERS, CONDENSERS, SCRUBBERS.

The Hopper Automatic Gas Governor

Send for Pamphlet.

Dunham Patent Specials.

Sole Makers of **The Mitchell Scrubber, Patented.**



ISBELL-PORTER CO.,

ENGINEERS AND CONTRACTORS FOR THE

Construction and Extension of Gas Works.

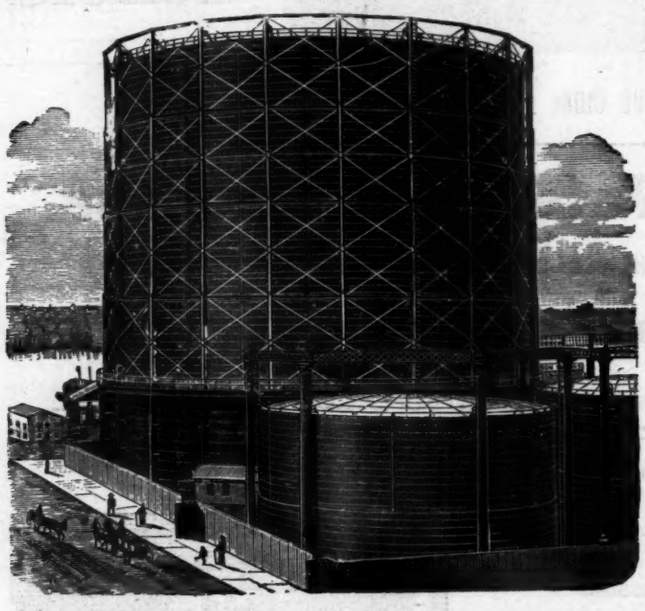
FOUNDERS AND MACHINISTS.

MANUFACTURERS OF

All Ironwork and Machinery Required in a Gas Plant.

Estimates, Drawings and Specifications furnished for the Alteration, Improvement, or Extension of Existing Works or the Construction of New Works.

245 Broadway, New York City. OFFICES **Bridge & Ogden Sts., Newark, N. J.**



The Continental Iron Works,

THOMAS F. ROWLAND, President.
WARREN R. HILL and CHAS. H. CORBETT, Vice-Presidents.
THOMAS F. ROWLAND, Jr., Secretary & Treasurer.

BROOKLYN, N. Y.

TAKE EAST TENTH OR TWENTY-THIRD STREET FERRIES FROM N. Y. TO GREENPOINT.

BUILDERS OF

Gas Holders.

Single and Multiple Section Gas Holders a Specialty.

Wrought Iron Gas Holder Tanks.

BENCH CASTINGS, RETORT LIDS.

Hydraulic Mains, Condensers, Scrubbers Purifiers, Valves, Etc.

Self-Sealing Retort Mouthpieces & Lids

For Round, Oval, or "D" Retorts.

ILLUMINATING GAS! FUEL GAS!

THE LOOMIS PROCESS.

Now in successful operation at Works of John Russell Cutlery Co., Turner's Falls, Mass., and Henry Disston's Son's Saw Works, Tacony, Pa.

The Cheapest Gas Generating System in the World.

Plans and Estimates Furnished.

BURDETT LOOMIS, - - Hartford, Conn.

To Gas Companies.

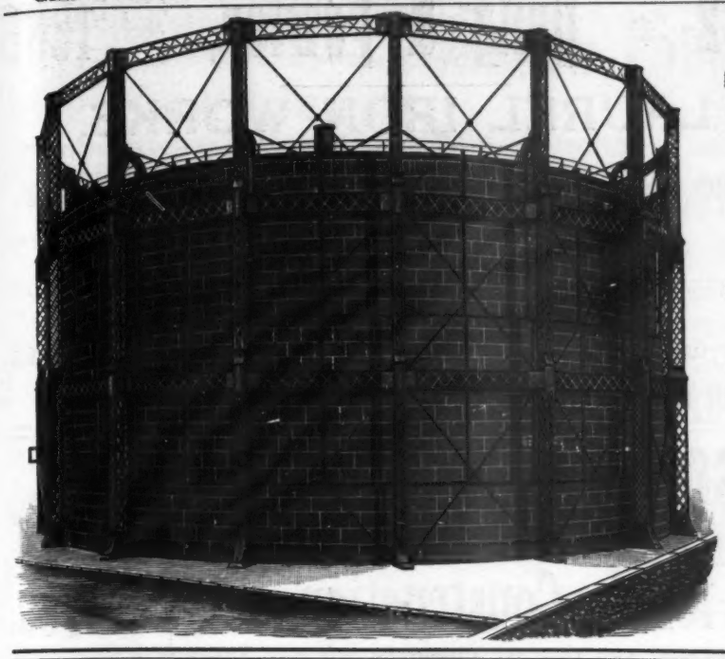
We make to order **CAP BURNERS** to burn any amount under a stated pressure. Send for samples.

Also, SERVICE CLEANERS, DRIP PUMPS, and STREET MAIN PROVING APPARATUS.

C. A. GEHRORER,

245 N. 8th St., Phila., Pa.

GAS WORKS APPARATUS AND CONSTRUCTION. GAS WORKS APPARATUS AND CONSTRUCTION.



H. Ranshaw, Prest. & Mangr. T. H. Birch, Asst. Mangr
William Stacey, Vice-Prest. R. J. Tarvin, Sec. & Treas.

THE STACEY MANUFACTURING CO
Established 1851.

Single, Double and Triple-Lift

GASHOLDERS,

Of any Capacity, with or without Wrought Iron or Steel Tanks.

Hydraulic Mains, Condensers, Scrubbers, Purifiers, Valves, etc.

Coal Gas Benches, Roof Frames,

OIL STORAGE TANKS.

Pressed Steel Mouthpiece Lids, Self-Sealing Mouthpiece Lids.

Cincinnati, Ohio.

George Shepard Page's Sons,

Sole Agents for

The "Standard" Washer-Scrubber,

The Walker Tar and Carbonic Acid Extractor, The Walker Sulphate and Ammonia Still,
The Walker Self-Sealing Pressed Steel Mouthpiece Lids.

The Berlin Center Valve. And Contractors for Ammoniacal Liquor.

No. 69 Wall Street, New York City.

GEORGE R. ROWLAND,
Formerly with the Continental Iron Works.
Draughtsman and Constructing Engineer.
Drawings, Specifications and Estimates furnished for the construction of new works or alteration of old works. Special attention given to Patent Office drawings.
Office, No. 245 Broadway, N. Y. City.

H. C. SLANEY,
Gas Engineer
466 Sixth Street, Brooklyn, N. Y.
Plans, Specifications and Estimates furnished for New Works, Alteration or Extension of Old Plants.

T. G. LANSDEN,
Consulting and Contracting Gas Engineer
Estimates, Plans and Specifications for New Works (Coa or Water Gas), and for Extensions or Alterations.
Room H, 108 N. 4th St., St. Louis, Mo.

WM. HENRY WHITE,

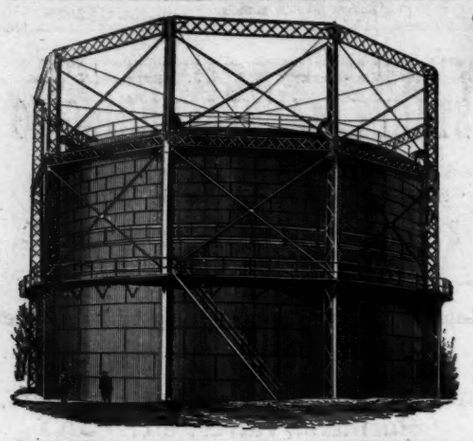
No. 32 Pine Street, - - - New York City.

ENGINEER AND CONTRACTOR FOR THE

ERECTION AND EXTENSION OF

GAS, WATER, AND ELECTRIC LIGHT WORKS.

Correspondence with Gas Companies contemplating extending or improving their Plants respectfully invited
Plans and Estimates Furnished.



1842 * Deily & Fowler, * 1896

LAUREL IRON WORKS.

Office, No. 39 Laurel Street, Philadelphia, Pa.

BUILDERS OF

Gasholders

Single or Telescopic. With or Without Iron or Steel Tanks.

OIL TANKS, WATER TANKS, AND GENERAL WROUGHT IRON WORK.

JAMES R. FLOYD & SONS,

Successors to HERRING & FLOYD,

Oregon Iron Works,

West 20th and 21st Streets, Between 10th & 11th Avenues, New York City.

Engineers and Contractors for the Construction of Gas Works.

MANUFACTURERS OF ALL KINDS OF CASTINGS AND GENERAL IRONWORK FOR GAS APPARATUS.

Bench Castings, Regenerative and Half Regenerative Furnace Castings, Condensers, Tower Scrubbers, Mechanical Scrubbers, Purifiers, Malleable Iron Retort Lids, Self-Sealing Retort Lids, Hydraulic Hoist Purifier Carriage, Crosses, Tees, Bends, Angles, Reducers, S-Bends, Sectional Sleeves, Plugs, Caps, Street Drips, etc., always on hand.

WOOD'S GAS SCRUBBING AND ENRICHING APPARATUS.

In use at Syracuse, Auburn, Watertown, Cortland and Geneva, N.Y.; Elizabeth, N. J.; Boston, Mass.; Jamaica Plain, Mass.; Providence, R. I.; Northern Liberties Gas Co., Phila.

Sole Manufacturers of the OGDEN QUICK-MOVING VALVE.

Premium Awarded, World's Columbian Exposition.

HEARNE CENTER SEAL, Operating One, Two, Three or Four Boxes.

SCIENTIFIC BOOKS.

GAS MANUFACTURE, by William Richards. 4to., with numerous Engravings and Plates, in Cloth binding. $12.

TECHNICAL GAS ANALYSIS. $3.

GAS CONSUMER'S HANDYBOOK, by Wm. Richards, C. 20 cents.

PRACTICAL TREATISE ON HEAT AND VENTILATION, with Special Relation to Illuminating, Heating and Cooking by Gas. By E. E. Perkins. $1.25.

CHEMISTRY OF ILLUMINATING GAS. By Norton H. Humphrys. $2.40.

PRACTICAL TREATISE ON HEAT By Thomas Box. 2d edition. $5.

PRACTICAL PHOTOMETRY: A Guide to the Study of the Measurement of Light. By W. J. Dibdin. $3.

CHEMICAL TECHNOLOGY: Vol. I., *Fuel and Its Applications*, $5. Vol. II., *Lighting*, $4.

IRONWORK: Practical Designing of Structural Ironwork. By H. Adams. $3.50.

GAS WORKS: Their Arrangement, Construction, Plant and Machinery. $5.

LIQUID FUEL FOR MECHANICAL AND INDUSTRIAL PURPOSES. By E. A. Brayley Hodgetts. $2.50.

COAL, SPONTANEOUS COMBUSTION OF. By Thomas Rowan, C.E. $2.

COAL: Its History and Use. By Prof. Thorpe. $3.50.

THE GAS WORKS OF LONDON. By Colburn. 60 cents.

HEAT A MODE OF MOTION. By John Tyndall. $2.50.

THE MANAGEMENT OF SMALL GAS WORKS. By C. J. R. Humphreys. $1.

ANUAL FOR GAS ENGINEERING STUDENTS. By D. Lee. 40 cents.

THEORY OF HEAT. By J. Clerk-Maxwell. $1.50.

AMMONIA AND AMMONIUM COMPOUNDS. By Dr. R. Arnold. $2.

DIGEST OF GAS LAW. $5.

DISTILLATION OF COAL TAR AND AMMONIACAL LIQUOR. By Geo. Lunge. New edition. $12.50.

A TREATISE ON THE COMPARATIVE COMMERCIAL VALUES OF GAS COALS AND CANNELS. By D. A. Graham. $3.

THE AMERICAN GAS ENGINEER AND SUPERINTENDENT'S HANDBOOK. By William Mooney. $3.

A TEXT BOOK OF INORGANIC CHEMISTRY. By Prof. Victor Von Richter. $2.

ILLUMINATING AND HEATING GAS. By W. Burns. $1.50

HANDBOOK FOR MECHANICAL ENGINEERS. By H. Adams. $2.50.

TREATISE ON MASONRY CONSTRUCTION. Baker. $5.

GAS ENGINEER'S LABORATORY HANDBOOK. By Jno. Hornby, F.I.C. $2.50.

GAS LIGHTING AND GAS FITTING. By W. P. Gerhard. 50 cents.

PRACTICAL PLUMBING. By P. J. Davies. $3.

AMERICAN PLUMBING. By Alfred Revill. $2.

CEMENT; A Manual of Lime and Cement, their Treatment and Use in Construction. By A. H. Heath. $2.50.

ELECTRICITY.

INDUSTRIAL PHOTOMETRY, with Special Application to Electric Lighting. By A. Palaz, Sc.D. $4.

ELEMENTS OF ELECTRIC LIGHTING, Including Electric Generation, Measurement, Storage and Distribution. By Philip Atkinson. $1.50.

ELECTRIC TRANSMISSION OF ENERGY. By G. Knapp. $3.

ELECTRICIAN'S POCKETBOOK. By Monroe and Jamieson. $2.50.

MAGNETISM AND ELECTRICITY. By J. Overend. 40 cts.

DYNAMO BUILDING. By F. W. Walker. 50 cents.

DOMESTIC ELECTRICITY FOR AMATEURS. By E. Hospitalier. $2.50.

PRACTICAL MANAGEMENT OF DYNAMOS AND MOTORS. $1.

PRACTICAL GUIDE TO THE TESTING OF INSULATED WIRES AND CABLES. $1.

ELECTRIC LIGHT FITTING. $2.

PRACTICAL ELECTRICITY. $2.50.

ELECTRICITY FOR ENGINEERS. $2.50.

ELECTRIICITY, Its Theory, Sources and Applications. By John T. Sprague, M.I.E.E. $3.

The above will be forwarded by express, upon receipt of price. If sent by mail, postage must be added to above prices. We take especial pains in securing and forwarding any other Works that may be desired, upon receipt of order. All remittances should be made by check, draft, or post office money order.

A. M. CALLENDER & CO., 32 Pine Street, New York.

GAS AND WATER PIPES.

THE OHIO PIPE COMPANY,

MANUFACTURERS OF

Cast Iron Gas & Water Pipe,

BRANCH AND SPECIAL CASTINGS.

Gas-House Bench Castings, Hydraulics, Lamp Posts, Flange Pipe and Specials, Architectural Castings, Building Columns, Joists, Cellar Grates, Sash Weights, etc.

GENERAL FOUNDERS AND MACHINISTS

Columbus, Ohio.

Cast Iron Pipe For Natural or Artificial Gas, Flange Pipe, Electric Light Posts.

The Addyston Pipe & Steel Co., Cincinnati, O.

The Chemistry of Illuminating Gas.

By NORTON H. HUMPHRYS. Price, $2.40.

A. M. CALLENDER & CO., 32 PINE ST., N. Y. CITY.

GAS METERS.

WARREN FOUNDRY AND MACHINE CO.,

Established 1856. Works at Phillipsburgh, N. J.

New York Office, 160 Broadway.

CAST IRON WATER AND GAS PIPE,

FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF

Flange Pipe for Sugar House and Mine Work. Branches, Bends, Retorts, etc., etc

EASTERN OFFICE: NEW YORK, 152 BROADWAY. WESTERN OFFICE CHICAGO, MONADNOCK BLK

M. J. DRUMMOND

MANUFACTURER OF

CAST IRON

FLANGE

GAS AND WATER PIPE

AND GENERAL FOUNDRY WORK

GEORGE ORMROD, Manger. & Treas., Emaus, Pa.
JOHN DONALDSON, Prest., Betz Bldg., Phila., Pa

EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA

MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

JOS. R. THOMAS,

No. 32 Pine Street, N.Y. City

CONSULTING AND CONSTRUCTING

Gas Engineer and Contractor.

PLANS, SPECIFICATIONS AND ESTIMATES FURNISHED.

Contracts taken for all Appliances required at a Gas Works,

Either for New Works or Extensions to Old Plants

Management of Small Gas Works.

By C. J. R. HUMPHREYS. Price, $1.

A. M. CALLENDER & CO., 32 PINE ST., N. Y. CITY

The Gas Engineer's Laboratory Handbook.

BY JOHN HORNBY, F.I.C. Price, $2.50.

A. M. CALLENDER & CO., 32 PINE ST., N. Y. CITY

1894 DIRECTORY 1894

OF AMERICAN GAS COMPANIES

Price, - - - - - - - - - $5.00.

A. M. CALLENDER & CO., - - No. 32 Pine Street, New York.

METRIC METAL COMPANY,

MANUFACTURERS OF

DRY GAS METERS

For all Kinds of Service.

ALSO MAKERS OF THE

MATCHLESS CLASSIC GAS COOK STOVES AND RANGES.

Send for '96 Stove Catalogue. Factory at Erie, Pa.

Established 1849. With the best facilities for manufacturing, is enabled to furnish reliable work and answer orders promptly.

NATHANIEL TUFTS,

153 Franklin St., Boston, Mass.

C. W. HINMAN, - - Manager.

MANUFACTURER OF

DRY GAS METERS.

Station Meters of any Capacity.

Test and Experimental Meters, Pressure Registers, Pressure Gauges.

METER PROVERS, PHOTOMETERS, STREET LANTERNS, ETC., ETC.

Apparatus for the Chemical Testing of Gas and Gas Liquor.

CHARLES E. DICKEY. JAMES B. SMALLWOOD. CHARLES H. DICKEY.

THE MARYLAND METER AND MANUFACTURING CO.

Established 1866.

BALTIMORE, North & Saratoga Sts. **CHICAGO, 122 & 124 Michigan St.**
NEW YORK, 838 Broadway. **SAN FRANCISCO, 221 Front St.**
BOSTON, 92 Water Street, Rooms 21 and 22.

CONSUMERS' & STATION METERS, PRESSURE GAUGES, Etc., Etc.

"Success" and "Perfect" Gas Stoves.

THE GOODWIN METER COMPANY,

1012-1018 Filbert Street, Philadelphia, Pa.

MANUFACTURERS OF

Consumers' and Station Meters,

Standard Photometrical and Analytical Gas Apparatus

"SUN DIAL" GAS COOKING AND HEATING STOVES.

Particular attention given to Repairing Meters and Scientific Apparatus. . . . .

GEORGE B. EDWARDS, Agent,
113 Chambers Street, N. Y. City.

THE KEYSTONE METER CO.,

Factory and Office, ROYERSFORD, PA.

WESTERN MANAGERS:
CAHILL, SWIFT & CO.,
121-207 South Seventh Street,
ST. LOUIS, MO.

PACIFIC:
WIESTER & CO.,
15 & 17 New Montgomery St.,
SAN FRANCISCO, CAL.

Gas Meters and Gas Stoves.

BARTLETT LAMP MFG. CO., 137-139 W. Broadway, N. Y. City, Agts. for New York, New Jersey & Connecticut.

GAS METERS. GAS METERS. GAS METERS.

THE AMERICAN METER CO.

Established 1834. Incorporated 1863.

WET AND DRY GAS METERS. PRESSURE REGISTERS. METER PROVERS.
STATION METERS. PRESSURE & VACUUM REGISTERS. PORTABLE TEST METERS.
EXHAUSTER GOVERNORS. PRESSURE & VACUUM GAUGES. EXPERIMENTAL METERS.
DRY CENTER VALVES. CRESSON GAS REGULATORS. AMMONIA TEST METERS.
GOVERNORS FOR GAS WORKS. MARSLAND WATER METERS. BAR & JET PHOTOMETERS.

Manufactories:
512 West 22d St., N. Y.
Arch & 22d Sts., Phila.

GAS STOVES.
SUGG'S "STANDARD" ARGAND BURNERS.
SUGG'S ILLUMINATING POWER METER,
Wet Meters, with Lizar's "Invariable Measuring" Drum.

Agencies:
125 & 127 S. Clinton Street, Chicago.
810 North Second Street, St. Louis.
223 Sutter Street, San Francisco.

HELME & McILHENNY,

(Established 1848.)

Gas Meter Manufacturers

1339 to 1349 Cherry Street, Philadelphia, Pa.

Wet and Dry Gas Meters, Station Meters, Experimental Meters, Meter Provers, Center Seals, Pressure Registers, Governors, Indicators, Photometers

AND ALL OTHER KINDS OF APPARATUS FOR USE IN GAS WORKS.

FOULIS' PATENT STATION AND DISTRICT GOVERNORS.

REPAIRING DEPARTMENT.—We employ a special force of skilled workmen repairing meters of ALL MAKERS.

D. McDONALD & CO.,

Established 1854.

154 West 27th Street, NEW YORK CITY.
51, 53 & 55 Lancaster St., ALBANY, N. Y.
34 & 36 W. Monroe St., CHICAGO, ILL.

MANUFACTURERS OF

Wet and Dry Gas Meters

STATION METERS, EXPERIMENTAL METERS, METER PROVERS, PRESSURE & VACUUM REGISTERS & PRESSURE GAUGES.

Meters of all makers Thoroughly Repaired.

(Established 1881.)

THE HILLEN METER CO.,

Manufacturers of Gas Meters.

All Sizes of Meters Constantly in Stock. Liberal Discount on Application.

Special Attention Paid to Repairing Meters of All Makers.

Address all Communications to

JOHN J. HILLEN, - - 200 Baltic Street, Brooklyn, N. Y.

NOT CONNECTED WITH ANY OTHER ESTABLISHMENT.

The Advertisement of the

OTTO GAS ENGINE WORKS,

33d and Walnut Streets, Philadelphia,

New York, 18 Vesey St. Boston, 19 Pearl St., Chicago, 245 Lake St.,

Occupies this space every alternate week.

JOHN J. GRIFFIN & CO.,

1513-1515-1517-1519-1521 Race Street, Philadelphia.

52 Dey Street, New York. WM. S. GRIBBEL, Manager.

75 N. Clinton St., Chicago. FREDERICK WAUGH, Manager.

MANUFACTURERS OF

STATION METERS, CONSUMERS' METERS,

Provers, Registers, Gauges, Experimental Apparatus, Etc.

Prompt Attention Given to All Repairing.

OUR SPECIAL NATURAL GAS METER

Is the Best ever offered. Over 30,000 now in use.

We manufacture in the United States, under the SAWER & PURVES PATENTS, the

Positive Prepayment Meter.

. . SIMPLE . .

. DURABLE .

. ACCURATE .

. RELIABLE .

All Parts Interchangeable

This Meter is an unqualified success in Great Britain. Its simplicity of construction, and the positive character of the service performed by it, have given it pre-eminence.

Needs only the care given an ordinary Meter. Saves MONEY, TIME and 'CONSUMERS, 'Dispenses with "DEPOSITS" and increases OUTPUT.